AN EXAMINATION OF ACADEMIC OUTCOMES FOR STUDENTS WHO ATTEND A SCHOOL-BASED AFTERSCHOOL PROGRAM

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While most research on the benefits of afterschool programs has shown positive behavioral outcomes, the results on academic outcomes have been mixed. This study focused on academic outcomes to further explore whether students who regularly attended a school-based afterschool program showed greater academic gains than students who did not attend. Previous research has shown mixed results in academic outcomes from afterschool programs depending on gender, program location and grade level; therefore, these variables were examined to evaluate where group differences may exist. Afterschool attendance was considered and narrowly defined to provide more understanding about dosage in afterschool outcomes research.

Students in this study were in grades 3 through 8 during the 2008-2009 school year, and they attended two charter schools in Western Pennsylvania. The afterschool programs operated within the charter schools. This is a secondary data analysis, using data that were collected for a program evaluation of the afterschool programs. To measure academic gains, a difference score was calculated from students' pretest and posttest scores on the 4Sight reading and mathematics assessments. The design of this study was a quasi-experimental design comparing students who regularly attended the afterschool programs (50% or greater attendance) with a randomly selected comparison group from the same population of charter school students.

An overall Analysis of Variance (ANOVA) on the difference scores showed that afterschool participants with regular attendance performed better than nonparticipants in

mathematics but not in reading. Further ANOVAs on the mathematics difference scores found no differences in gain scores by gender. Elementary students showed greater mathematics gains than middle school students, and students who attended the afterschool program at School M showed greater mathematics gains than students at School H. The reading gain scores were also further analyzed with ANOVAs, and boys showed greater gains than girls, elementary students showed greater gains than middle school students, and students at School M showed greater gains than students at School H. No correlation was found between the number of days of afterschool attendance and reading or mathematics gain scores. Findings are related to future directions for afterschool research and implications for afterschool providers.

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1.0 INTRODUCTION

"In every neighborhood, all across our country, there are good people insisting on a good start for the young, and doing something about it" (Rogers, 2003, p. 155).

"We must not, in trying to think about how we can make a big difference, ignore the small daily differences we can make which, over time, add up to big differences that we often cannot foresee" (Edelman, 1987, p. 107).

Afterschool programs have been in existence for over a century in various forms (Halpern, 2002). They began in the late 1870s, initially with volunteers providing activities for boys in churches or in vacant spaces within buildings. Eventually settlements began to organize activities for girls also (Halpern, 2000). Between 1900 and 1910, public schools provided additional recreational and play activities that were not part of the structured school day (Simkhovich, 1904). During World War II, programs increased temporarily as women began working while men were serving in the military (Dryfoos, 1999). In the 1950s and 1960s funding for programs grew gradually through social welfare federations, government funding, and the commencement of the United Way (Halpern, 2000). Within the last twenty years, children's involvement in afterschool programs has grown exponentially. Between 1991 and 1997, the number of children enrolled in before and afterschool programs increased from 1.7 million to 6.7 million (Cappizano, Tout, & Adams, 2000; Seppanen et al., 1993). According to data collected in the 2005 Afterschool Programs and Activities Survey of the National Household Education Survey

(ASPA-NHES: 2005), 20% of children ages 5 through 12 are involved in afterschool programs (Lawrence, Kreader, & National Center for Children in Poverty, 2006).

A number of factors have contributed to the considerable growth of afterschool programs. First, in the 1980s many women began working outside the home, which increased the need for childcare arrangements after school (Hollister, 2003; Vandell & Shumow, 1999). A decade later, the passage of the Welfare Reform Act in 1996 also increased the number of parents working, because it required people who were receiving public assistance to work a designated amount of time to remain eligible for assistance (Dryfoos, 1999; Hollister, 2003). A second reason for growth in afterschool programs was the decline in safety in neighborhoods, especially in urban, low-income areas (Halpern, 2000). The lack of adult supervision and youth development activities often resulted in increased risky behaviors and youth crime (Carnegie Council, 1992). Finally, afterschool programs have increased in numbers because funding from foundations, the private sector, and from state and federal agencies has grown considerably (Riggs & Greenberg, 2004a). In fiscal year 1998, the United States Congress authorized $40 million dollars in funding to schools to create 21st Century Community Learning Centers (21st CCLCs), which are school and community based afterschool programs (Hollister, 2003). In 2008, this amount had grown to $1.08 billion dollars (Weiss, Little, Bouffard, Deschenes, & Malone, 2009). Even the American Recovery and Reinvestment Act, which was passed in February 2009, allocated over $1 billion dollars towards afterschool programs (Afterschool Alliance, 2009).

Afterschool programs are heterogeneous, serving a variety of purposes, involving a variety of activities and existing in various locations, such as schools, religious organizations, and community centers (Riggs & Greenberg, 2004a). Halpern (2000) suggests that the primary purpose of afterschool programs should be to provide opportunities for youth to develop their

autonomy and to learn experientially. Parents with school-age children support this idea, expressing that they want afterschool activities for their children that foster interests, values, and growth (Duffett, Johnson, Farkas, Kung & Ott, 2004). Others propose that afterschool programs are best suited to develop children's social and emotional skills (Durlak & Weissberg, 2007) and to reduce juvenile crime (Goldschmidt & Huang, 2007). Many others propose that afterschool programs should focus on academic outcomes, to assist students who lag behind their peers (Hock, Pulvers, Deshler, & Schumaker, 2001; Mahoney, Lord, & Carryl, 2005; Posner & Vandell, 1994). Some have hoped that afterschool programs could be the panacea for poor educational systems and could assist in reducing the achievement gap (Lauer, et al., 2006).

In human development, the impetus for change often results from a combination of internal forces and external ones, and this has been true for the field of afterschool programs also. While those within the field have different ideas about what outcomes afterschool programs should be attempting to reach, funders from outside the field have required programs to specify outcomes and to measure them to determine the effectiveness of their investments (Mahoney & Zigler, 2006). The C. S. Mott Foundation published resources to assist programs with selecting short-term and long-term outcomes and various methods for measuring them (2005), and the Harvard Family Research Project created an online database of research and program evaluations specific to out-of-school time. Results about the effectiveness of afterschool programs have been mixed with some showing encouraging academic and social gains for children (Durlak & Weissberg, 2007; Jenner & Jenner, 2007; Posner & Vandell, 1999) and others showing little to no academic gains as a result of afterschool program participation (U S Department of Education 2003; Zief & Lauver, 2006).

1.1 RESEARCH QUESTIONS

This study will contribute to current research by examining reading and mathematics outcomes for elementary and middle school-aged children who participate in a school-based afterschool program. It will focus on academic outcomes because school success is one of the primary developmental tasks for children in middle childhood and because afterschool programs have shown inconclusive results on the academic benefits of afterschool programs. In this study, regular afterschool attendance will be defined as having an attendance rate of at least 50% at the subject specific (i.e., reading or mathematics) component of the afterschool program. The following research questions will guide this study.

1. Do elementary and middle school students who regularly attend school-based afterschool programs show greater academic gains than students at the same schools who do not attend the school-based afterschool programs?

2. For elementary and middle school students who regularly attend a school-based afterschool program, are there variations in academic outcomes based on gender, grade level, or program site?

3. Is the afterschool program attendance rate at a school-based afterschool program related to academic outcomes?

The developmental tasks of middle childhood will be outlined and connections will be made to Bronfenbrenner's ecological theory of development. Key studies of afterschool programs will be summarized and differences between study results will be explored. The results of this research study will be analyzed and presented, connections between it and further research will be discussed, and implications for afterschool programs will be described.

2.0 LITERATURE REVIEW

2.1 DEVELOPMENT IN MIDDLE CHILDHOOD

The focus of this study will be the developmental period of middle childhood, which generally includes children ages 6-12 years old. At the beginning of these years, children are beginning formal schooling and their families are still the primary source of identity for them. As they progress through middle childhood, other people outside of the family, new settings, and institutions become increasingly important to the child (Halpern, 2000). While this is not a time of radical physical growth, such as in early childhood or adolescence, children are going through fundamental changes in cognitive and emotional development. According to Erikson's eight "stages" (1950), children in middle childhood are at the stage of industry, where their goals are to create and produce things, to learn to use the tools of their society, and to develop their individual skills. When children do not accomplish these tasks, they may deal with a sense of inferiority. Learning about their individual skills and talents during this period lays the foundation for youth to explore their identities as they enter adolescence and to begin to establish committed, meaningful relationships. Middle childhood is a time where children's social relationships become more complex, as tasks and projects require children to work together and as friendships become more important (Erikson, 1950). Csikszhentmihalyi (1993) proposes that middle childhood should be a time when children shadow adults and learn through interacting

with them and when they learn practical skills for completing tasks and emotional skills for expressing their feelings.

Many theorists gain understanding into different developmental periods by identifying the primary developmental tasks within each stage. Masten and Coatsworth (1998) identify the primary tasks of middle childhood as school adjustment, including attendance and appropriate conduct; academic achievement, including becoming competent in reading and mathematics; getting along with peers; and following societal rules and demonstrating prosocial behavior. Eccles (1999) proposes that when children experience success in these tasks, it can give them a sense of accomplishment as they face increasingly complex tasks through their middle school and high school years. It sets them on a course towards achievement that will shape their success in school and work (Eccles, 1999). When students do not feel competent in the main tasks and environments of their lives, they report negative feelings and behaviors, such as depression, social isolation, and aggression more often than their peers (Eccles, Wigfield, & Schiefele, 1998; Harter, 1998).

Changes in cognition and social relationships contribute to students developing either feelings of success or inferiority during middle childhood (Eccles, 1999). These cognitive changes include gaining the abilities to increase in their metacognition, reflecting on their successes and failures, and becoming better at learning how to remember and retrieve information. With these new modes of thinking, children begin to develop perspective taking and to understand differences between themselves and others (Piaget & Inhelder, 1973). As children begin to spend more time in environments outside of their family, such as schools and peer groups, they are exposed to social comparison and competition in these new environments (Eccles, 1999). Their identities may be based around their competence in a sport, in school, or in

another activity, such as arts or music (Higgins & Parsons, 1983). As children experience success and failures, they become more realistic about their abilities during these years.

As more children have begun attending afterschool programs, these contexts have become an important environment for development in middle childhood. They provide another setting where children can learn about themselves, about interacting with peers and adults, and about accomplishing goals. For children who are not finding success in the other environments in their lives, afterschool programs may provide opportunities for them to experience success in activities such as sports or arts that may not be available during the regular school day or to strengthen academic skills, so that they can be successful in school (Eccles, 1999).

2.2 BRONFENBRENNER'S ECOLOGICAL THEORY OF DEVELOPMENT

Besides considering the primary tasks of development for middle childhood, it is also important to understand children's development in contexts and the connections that exist between these contexts. Bronfenbrenner (1979) proposed that human development must be understood in the complexity of relationships and structures in which people participate and which influence them. The analogy that he uses to describe his theory of development is that each person is like a set of Russian nested dolls. The first layer of development consists of microsystems, which are contexts that include the person. For example, for elementary or middle school children, microsystems would include their families, their classrooms at school, their peer groups, and any other settings in which they are directly involved, such as afterschool programs or sports teams. The next level of development is mesosystems, which are interrelations between two or more microsystems. The third layer is exosystems, which are contexts that do not directly include the

person but that affect the person. For example, the faculty of a school makes a decision about curriculum that affects the child, but the child is not a member of the faculty of the school. Finally, there are macrosystems, which are structures that exist on a larger scale, such as socioeconomic, ethnic, or religious groups, that have belief systems that influence the person's development and environment (Bronfenbrenner, 1979). For example, children in the United States live in a country where individual achievement is emphasized, compared to children in some countries where the collective group is emphasized over the individual.

Bronfenbrenner's theory is ideal for understanding afterschool programs because of his interest in how the context and the relationships between contexts affect the individual. Afterschool programs are different from schools and families, and they possess unique qualities that need to be considered when examining outcomes for students who attend programs. Bronfenbrenner's theory has been used by a number of researchers to understand the changes that happen in students who attend programs. Posner and Vandell used Bronfenbrenner's theory to recognize that afterschool environments are not static for students and that there are connections between children's activities during the afterschool hours and their behavior at school and at home (1999). Mahoney, Lord, et al. (2005) also used Bronfenbrenner's model to identify connections between individual characteristics of students, specifically engagement in afterschool activities, and behavioral and academic outcomes. Vandell, Reisner, and Pierce (2007) have implemented Bronfenbrenner's theory in a useful and visible way by proposing the following model to illustrate the connections between individual factors, afterschool experiences and student outcomes (see Figure 1).

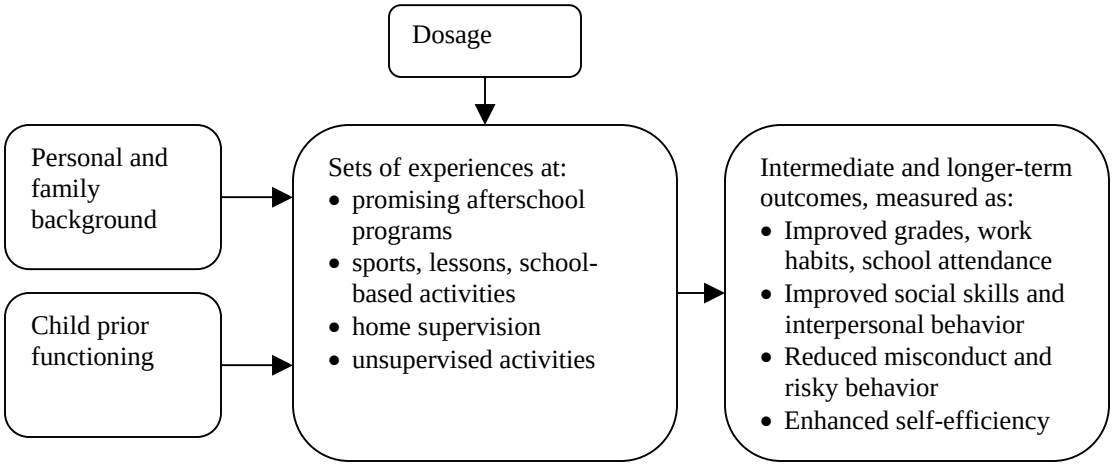

Figure 1. Theoretical linkages between afterschool experiences and student outcomes in the elementary and middle grades. Source: Vandell, Reisner and Pierce, p. 1 (2007).

While this model is helpful for visualizing the microsystems and processes that matter for understanding children's development in afterschool experiences, measuring outcomes in children as a result of participation in afterschool programs is difficult. As Meyers et al. (2007) caution, afterschool program evaluators should avoid the simplified "single-dose-main-effect model" in which the "dose" needed to realize outcomes from the intervention is oversimplified, the relationship between the intervention and the outcome is oversimplified, and important mediating and moderating variables are excluded from the outcomes analysis. "Perhaps the thorniest problem is attributing outcomes to the afterschool program itself, as distinguished from the influences that family, school and community all have on young people" (Dryfoos, 1999, p. 130). Along with these complexities, many afterschool programs serve children living in low-income settings, who have higher rates of turnover, which makes it difficult to track outcomes in children over time (Halpern, 2002).

Meyers et al. (2007) provide a number of guidelines for how afterschool programs should be evaluated. First, programs should be studied in context and viewed as having a complementary role in children's lives and not a primary role. "Afterschool programs can be thought of as having a synergistic effect on child development by responding to and encouraging developmental experiences promoted in other settings, as well as a source for generating positive new experiences"(Meyers et al., 2007, p. 2). Second, there should not be unrealistic expectations for the outcomes of afterschool programs. The original objective of the afterschool movement was to encourage healthy development of children within safe and supervised settings. Finally, afterschool programs need to be evaluated on specific program objectives that are based on sound developmental theory and on actual services being delivered to children attending the program. For example, the program evaluation should not use grades as an outcome measure for an afterschool program that focuses primarily on sports or the arts.

In the next section some of the major studies that have examined outcomes in children who attended afterschool programs will be reviewed, and some specific variables that may explain the discrepancies in results among program evaluations will be highlighted.

2.3 REVIEW OF AFTERSCHOOL STUDIES

Many studies and evaluations of afterschool programs have found positive social and emotional outcomes in children who attended programs. Durlak and Weissberg (2007) completed a meta-analysis of 73 program evaluations and studies, all of which had some type of control group and which were programs focused on developing personal and social skills. They found that youth who participate in afterschool programs improve significantly in feelings of self-confidence and

self-esteem, school bonding, positive social behaviors, and they exhibit reduced problem behaviors including aggression, noncompliance, conduct problems, and drug use. In a longitudinal study, Goldschmidt and Huang (2007) found that students who consistently attended an afterschool program in Los Angeles demonstrated a significant reduction in juvenile crime compared to students who attended the program sporadically or compared to the control group. Others have found positive results for social adjustment and peer relations (Marshall et al., 1997; Posner & Vandell, 1994).

While much of the literature shows healthy developmental results for social and emotional outcomes, the literature on academic outcomes for children attending afterschool programs has been inconclusive. Posner and Vandell (1994) were some of the first researchers to show positive academic outcomes for youth from afterschool programs. They studied low-income children in third grade who attended nine different schools in Milwaukee, Wisconsin. They compared 34 students who attended a formal afterschool program with 182 students who had other afterschool care arrangements such as mother care, informal adult supervision, and self-care. When they controlled for maternal education, race, and family income, they found that attending a formal afterschool program was associated with better grades and conduct in school.

Posner and Vandell conducted a follow-up study with the same group of children, following them through fourth and fifth grades (1999). They were not able to continue to compare the afterschool program students to the other students, because only 17 children attended the afterschool program for all three years. However, they focused on differences in gender and the transactional relations between students' participation in afterschool activities and their fifth-grade adjustment. They found that children who had better grades and higher levels of social adjustment in third grade were more likely to participate in extracurricular activities,

including afterschool programs in fifth grade. Similarly, children who had higher rates of behavior problems in third grade were more likely to spend time outside in unstructured activities during fifth grade. They analyzed the results for this study separately for African-American and White children, because they found significant ecological differences between the groups in neighborhood, income, and family structure.

Mahoney, Lord, et al. (2005) studied afterschool participation of low-income children by examining four patterns of care that children in first grade through third grade experienced. Children primarily participated in one of the following types of care: afterschool program care, parent care, combined parent/self-sibling care, and combined other-adult/self-sibling care. They examined the relationship between the types of afterschool care and academic performance, as measured by school grades and reading achievement. They found that children who participated primarily in afterschool program care showed significantly higher reading achievement at the end of the year than children in the other care arrangements, even after considering baseline academic functioning and demographic factors. They considered the students' level of engagement in the afterschool program and found that students who had low engagement in the program did not show as strong of academic results as children who were highly engaged.

Jenner and Jenner (2007) studied at-risk children who were participants in 21st CCLC programs in Louisiana during the 2003-04 school year. The children were in Grades 3 and 5 and the programs were located in urban and rural settings. Program participants showed greater gains than nonparticipants on mean Spring standardized test scores that included a composite score of reading, mathematics, and language. One focus of their study was whether variations in afterschool attendance affected academic outcomes. The results of their study were based on students who had attended the program for at least 30 days during the school year, which is the

federal government's guideline for measuring outcomes of program participants in 21st CCLC programs. They also examined the results based on whether students attended 30 to 59 days, 60 to 89 days, and 90 days or more, and they found that higher levels of participation were associated with higher levels of academic growth, even while controlling for prior functioning. When they examined their results based on students' initial academic achievement, they found that the academic differences were significant for students who initially fell between the 25th and 75th quartiles, but they were not significant for students below or above that range.

Lauer et al. (2006) compiled a meta-analysis of research on out-of-school-time programs for at risk youth, including afterschool programs and summer programs. They analyzed 35 studies of programs that involved control or comparison groups and that met other criteria essential for a valid analysis. They found small but statistically significant positive effects of out-of-school-time programs on student achievement in reading and mathematics and larger positive effect sizes for programs with specialized instruction, such as reading tutoring. Of the 24 studies that were measuring both reading and mathematics outcomes, only three showed positive effects on both outcomes. Of the remaining 21 studies, 12 showed null effects for reading and mathematics, four found a positive effect for mathematics and five found a positive effect for reading.

Vandell et al. (2007) conducted the Study of Promising Afterschool Programs, a longitudinal study in which they followed 3000 low-income, ethnically diverse, elementary and middle school students from urban and rural areas, about half of whom participated in afterschool programs. They focused on measuring academic and social outcomes for students who attended high quality programs. They grouped the students into three categories: *Program Only* included children who attended the afterschool program 2 to 3 days per week and who did

not have other afterschool options; *Program Plus* included students who participated in the program 2 to 3 days a week but also participated in another afterschool activity, such as organized sports or a church activity; *Low Supervision* included students who spent 1 to 3 days a week unsupervised by adults after school and who had sporadic participation in other activities such as sports, arts, or school-based activities. After examining students for 2 years, they found that elementary students in the *Program Only* or *Program Plus* groups demonstrated significant gains in standardized mathematics test scores and they also showed gains in teacher reports of work habits and task persistence, compared to the *Low Supervision* group. Middle school students in the *Program Only* or *Program Plus* groups also demonstrated significant gains in standardized mathematics test scores, compared to the *Low Supervision* group.

In one of the most recent evaluations of afterschool programs, students who attended a regular afterschool program that provided students with homework help and locally assembled educational materials were compared to students who attended an afterschool program that utilized highly structured instructional lessons on reading or mathematics (Black et al., 2008). Students in grades two through five who were performing below grade level were randomly assigned to a regular afterschool program or to a program where they would receive 45 minutes of specialized instruction in either reading or mathematics four days a week. After the first year of implementation, Black et al. (2008) found positive and statistically significant impacts for the enhanced mathematics program, representing 8.5% more growth over the school year than students who participated in the regular afterschool program. After the second year of implementation, they again found that one year of enhanced instruction in mathematics produced positive and statistically significant impacts on student achievement, as measured by Stanford Achievement Test, 10th edition mathematics scores, but they did not find any additional benefit

to participating in the program for two consecutive years (Black et al., 2009). Despite the positive results from the mathematics program, Black et al. (2009) found no statistically significant results in reading achievement for students who attended one year of the afterschool program with enhanced reading instruction. They found that participation in the enhanced reading program did not produce statistically significant results on a standardized reading test or results in students' academic and behavior outcomes. They also found that participating in the enhanced reading program for two years resulted in fewer gains on students' total reading scores, when compared to students who participated in the regular afterschool program (Black et al., 2009).

While many studies and evaluations have had positive or mixed results, some studies have found null results when evaluating academic outcomes in youth who attended afterschool programs. The landmark study that is cited the most as verification for afterschool programs not affecting academic outcomes is a study that was commissioned by the United States Department of Education (2003) to evaluate the 21st CCLCs. The study included data for 1,000 elementary students in 7 school districts and 4,300 middle school students in 32 school districts. At the elementary level, students participating in afterschool programs were compared with those in randomly assigned control groups, and at the middle school level students participating in afterschool programs were compared with those in a matched comparison group. At the elementary level, reading test scores and grades in most subjects were no higher for program participants than for nonparticipants. On average, programs also had no impact on whether or not students completed their homework. For middle school students, grades in mathematics were slightly higher for participants but no different in other subjects. After the second year of program implementation, they did not find any differences for elementary students on academic

outcomes including reading test scores or grades (Dynarski et al., 2004). The only academic outcome that they found for middle school students was that program participants had higher grades in social studies, but not in English, mathematics, or science.

The release of the first-year findings from this evaluation resulted in considerable discussion and critique. This evaluation was used to propose that funding for the 21st CCLC afterschool programs should be reduced by 40% from 1 billion to 600 million for fiscal year 2004, since the afterschool programs were not reaching their intended outcomes. This funding reduction did not occur, but the response to limitations of the evaluation served to influence future studies of afterschool programs. One critique of the 21st CCLC evaluation is that the researchers evaluated programs that were in their initial stages of implementation, in which the programs were still addressing startup issues such as staff training and communication between afterschool programs and the school (Riggs & Greenberg, 2004a). It would have been better if only well established programs were studied. Second, the evaluators did not control for baseline differences in academic achievement and behavior in the middle school component, and it was later found that the middle school students in the intervention group were at higher risk than those in the control group (Mahoney & Zigler, 2006). Third, elementary students who attended the afterschool program had low levels of program attendance and high levels of attrition, which could explain the lack of difference between afterschool participants and the control group (Mahoney & Zigler, 2006). Fourth, some of the schools involved in the evaluation ran other afterschool programs simultaneously that were funded with different monies, so some of the participants in the control group were receiving treatment similar to the intervention group (Riggs & Greenberg, 2004a). Finally, a limitation of the evaluation that could not have been anticipated is the lack of generalizability of the evaluation's findings. The study was conducted

during the 2000-2001 and 2001-2002 school years, before the No Child Left Behind Act was passed in January 2002 (Mahoney & Zigler, 2006). The passage of this act reauthorized the funding for 21st CCLCs and it resulted in significant changes in the design and evaluation of these afterschool programs. To highlight a few of the most salient changes for the 21st CCLC afterschool programs, program administration and evaluation was transferred from the federal to the state level and programs were required to have a stronger focus on academic enrichment activities (Mahoney & Zigler, 2006).

A second study that did not find academic benefits for students is a meta-analysis conducted by Zief et al. (2006) on five experimental studies of afterschool programs. Their purpose was to understand the effects of typical afterschool programs that included academic support services, since much of the funding for afterschool programs requires them to have academic components. The studies included programs that served students in kindergarten through twelfth grade. Zief et al. (2006) found no effects and no differences between youth in the program group and youth in the control group. When they examined subgroups of students, they found small but insignificant results. It should be noted that for some of the outcomes they were examining, only two of the studies addressed those outcomes, so the pooling of study results on specific questions was not based on five studies for each of the specific areas. Also, one of the five studies was the United States Department of Education (2003) study, which was described previously. Table 1 summarizes the salient features from prior research that are relevant to the current study.

Table 1.
Summary of Studies Examining Academic Outcomes From Afterschool Programs

Study authors and year	Children in study	Type of program(s)	Academic outcomes	Measure of attendance
Posner and Vandell, 1994	Children were in third grade, and they were from low-income, urban families. Thirty-four students attended the afterschool program and 182 were not in the program.	There were eight program sites, and different sites offered different program components including specialized academic instruction, homework help, academic enrichment activities, and recreation activities.	After controlling for maternal education, race, and family income, attending the afterschool program was associated with better grades and conduct in school.	Children reported on their afterschool activities, which could include the formal afterschool program or informal activities. They reported on three occasions between February and June.
Mahoney, Lord, and Carryl, 2005	The study included 599 children in grades 1 through 3 from a large city, mostly from low-income families.	The afterschool programs were part of an initiative by the city's public school district. There were a number of program sites throughout the city, and they were all designed to provide a safe space for students, to promote academic and social competence, and to promote physical health.	After controlling for prior academic functioning, children who were actively engaged in a formal afterschool program showed higher reading achievement than children who were cared for by a parent, other adult, or nonadult. No differences were found in school grades of afterschool participants.	Parents reported on children's afterschool care arrangements at one point in the fall of the school year, although the study examined results over the course of the whole school year.

Study authors and year	Children in study	Type of program(s)	Academic outcomes	Measure of attendance
Jenner and Jenner, 2007	This study included 1,192 children in grades 3 and 5 from urban and rural locations in Louisiana, primarily from low-income and/or minority families.	The programs were 21st CCLC programs that offered academic assistance.	After controlling for prior academic functioning, afterschool participants showed greater gains on a composite academic score of mathematics, reading, and language than nonparticipants. Higher levels of attendance were associated with greater academic gains.	Program staff recorded daily attendance. Afterschool participants needed to attend at least 30 days to qualify as a participant, and results from participation were based on attending 30-59 days, 60-89 days, and 90 or more days.

Study authors and year	Children in study	Type of program(s)	Academic outcomes	Measure of attendance
Lauer et al., 2006	Youth in grades K-12 who had at least one risk factor for school failure, which could include low performance on standardized tests, low socioeconomic status, and low maternal education.	This was a meta-analysis of 35 program evaluations, dissertations, conference presentations, or research articles. All studies included a control or comparison group in their analysis and all studies provided some type of out of school time programming, which included afterschool and summer enrichment programs.	Participation in out of school time programs showed small but statistically significant positive effects on reading and mathematics achievement.	Attendance was measured in various ways and was not considered for the meta-analysis.
Vandell, Reisner, and Pierce 2007	This study included 1,434 elementary students in grades 3 through 5 and 855 middle school students in grades 6 through 8. The students were from ethnically diverse, low-income, urban, and rural communities.	Nineteen high quality programs that serve elementary students and 16 programs that serve middle school students were included. Programs offered a variety of learning opportunities including academic, recreational, arts, tutoring, games, and service opportunities.	Elementary students and middle school students who attended the program approximately two or more days a week over two years showed significant gains in mathematics standardized test scores when compared to students who were not involved in afterschool programs. No differences were found for reading standardized test scores.	Children typically attended the afterschool program two to three days a week.

Study authors and year	Children in study	Type of program(s)	Academic outcomes	Measure of attendance
Black et al., 2009	Students in grades 2 through 5 who were performing below grade level. There were 1,936 students in the mathematics analysis and 1,531 students in the reading analysis.	Students were randomly assigned to an afterschool program that used a structured curriculum for specialized mathematics and reading tutoring or an afterschool program that provided homework help with occasional supplemental instruction.	Students who participated in the focused mathematics tutoring program for one year showed greater gains on standardized tests than students in the regular afterschool program, but students who received two years of mathematics instruction showed no additional gains. Students who participated in the specialized reading tutoring program for one year showed no difference in standardized test scores than students in the regular afterschool program. Students who participated in the reading tutoring program for two years showed fewer gains than students who participated in the regular afterschool program.	Daily attendance was collected at both programs for all days when the specialized instruction was offered.

Study authors and year	Children in study	Type of program(s)	Academic outcomes	Measure of attendance
U.S. Department of Education, 2003	This study included 1,000 elementary students in seven school districts and 4,300 middle school students in 32 school districts.	The programs were 21st CCLC programs which operated in public school buildings and offered academic, recreational, and cultural activities.	Elementary students showed no difference on reading test scores than nonparticipants. Elementary students showed higher social studies grades compared to nonparticipants and middle school students showed increased mathematics grades compared to nonparticipants.	Attendance was measured by the number of days a student was present. For elementary students, students who attended at least one day were included in the analysis, and for middle school, students who attended at least three days in the first four weeks were included in the analysis.
Zief, Lauver, and Maynard, 2006	Youth in K-12 programs.	This was a meta-analysis of five experimental studies of afterschool programs. All of the programs combined youth development programming with academic support services.	Two of the studies measured academic achievement through standardized reading test scores, and no differences were found between afterschool participants and nonparticipants. No differences were found in school grades between participants and nonparticipants, except that elementary students had higher social studies grades. (Note: This meta-analysis included the U.S. Department of Education study, 2003).	Attendance was measured in various ways and was not considered for the meta-analysis.

2.4 UNDERSTANDING DIFFERING RESULTS IN AFTERSCHOOL STUDIES

As the previous studies show, results of academic outcomes from afterschool programs have not been definitive, and as Scott-Little, Hamann and Jurs (2002) note, the field of afterschool research is emerging. Riggs and Greenberg (2004a) recommend that the heterogeneity in programs and in students who attend them should prompt more researchers to consider variations when examining outcomes in students who attend programs. The question they raise is "for whom are afterschool programs most effective and under which circumstances?"(Riggs & Greenberg, 2004a, p. 179). In this section, some of the salient variables for understanding the differences in academic outcomes will be described. The differences fall under three primary categories: program qualities, demographic variables and group differences, and study design issues.

Afterschool programs differ in many qualities, including various locations for programming (e.g., community centers, libraries, churches or schools). Some have said that afterschool programs that are located in schools have benefits such as not needing transportation to the program and access to resources within the schools (Riggs & Greenberg, 2004a), whereas others have said that programs located in schools might not be as successful because students view the program as similar to school, which may be perceived negatively by them (Halpern, 2000). A second difference in afterschool programs is in the outcomes that they are trying to achieve. Programs can be classified into two general types: school-aged child-care and youth development programs (Committee on Community –Level Programs for Youth, 2000). School-age child-care programs exist primarily to provide a safe place for students during afterschool

hours, and they include activities such as arts and crafts and homework time, where children are supervised but there may not be intentional design to the activities. Youth development programs exist primarily to promote positive development within specific areas such as academic success, computer skills, the arts or physical fitness. Within programs that have an academic focus, some are designed to reach academic outcomes by providing specialized instruction and tutoring, whereas others are designed to assist with homework completion, which will then hopefully lead to improved grades. A third way that programs differ is in the length of the program day and the number of days per week the program is offered. Some afterschool programs run two to three days per week and others run for five days a week; some may be one hour in length whereas others are three or more hours in length. A fourth characteristic of afterschool programs that may be influential in explaining student outcomes is program quality. Some researchers who have examined academic outcomes from programs have only included programs that have met certain quality standards to increase the validity of their findings (Black, et al., 2008; Vandell, et al., 2007) whereas other studies have not addressed program quality as a primary component of their studies (Mahoney, Lord, et al., 2005; Posner & Vandell, 1994).

Since the field of afterschool research is still emerging, there is not yet a uniform standard for program quality, but some researchers and organizations have begun to define these criteria. Beckett, Hawken, & Jacknowitz (2001) surveyed the research literature to determine what qualities were associated with high-quality afterschool programs, and they grouped these practices into three categories: staff management practices, program management practices, and community contacts. Staff management practices included hiring and retaining educated staff, training staff, and providing attractive compensation. Some examples of good program management practices include programs that provide a variety of age-appropriate activities,

programs that have a low child-to-staff ratio, programs that are connected to but also complement the regular school day, and programs that have clear goals and evaluation methods. Examples of strong community contacts would include involving families in the program, using volunteers in the program, and connecting with community-based organizations. In the Study of Promising Afterschool Programs, Vandell et al. (2007) defined high-quality afterschool programs as those in which staff and children have supportive relationships, program participants have healthy relationships with each other, and children have wide-ranging opportunities for academic support, recreation, art, and other enrichment activities. The New York State Afterschool Network has identified 10 essential elements of quality afterschool programs (See Appendix A). A single program may have varying levels of quality for different components of the program (Lauer et al., 2006). For example, a program that has strong relationships between staff and students might not be as strong in academics or a program that excels in academics and relationships might not be as strong at family and community connections.

Another way of considering program quality is Durlak and Weissberg's approach (2007), which identified four evidence-based qualities (sequenced, active, focused, and explicit) that are essential for programs to show positive academic and social outcomes. Sequenced means that program activities are being taught in a logical, orderly fashion, where small steps and accomplishments lead to larger, more complex learning. Active refers to students having opportunities to put their learning into practice through hands-on activities and to receive regular feedback from program staff about their learning. Focused and explicit means that the program has at least one component devoted to developing social skills and that those skills are clearly defined, such as self-control or problem-solving skills. In their meta-analysis, Durlak and Weissberg found that 39 programs that exhibited all four qualities demonstrated favorable

academic and social outcomes, including improved feelings of self-confidence and self-esteem, school bonding, positive social behaviors, school grades and achievement test scores, and reduced problem behaviors and drug use. The 27 programs that did not have all four qualities did not produce statistically significant results.

A second category of differences that may explain varied outcomes from afterschool programs is demographic variables and group differences. Grade level may be an important aspect to consider when determining who shows the greatest academic success from afterschool programs. It may be that younger children in the early elementary years show greater growth in afterschool programs, because if they started the program with an academic delay, they do not have as much to progress to catch up with their peers as middle school students, who may have a two to three year delay behind their peers in a specific academic area (Riggs & Greenberg, 2004a). In one study, Riggs and Greenberg (2004b) found that Latino children younger than 8 years who attended an afterschool program with intensive academic support increased their spelling and mathematics achievement at significantly greater levels than children 8 years and older. This would lend support to the idea that programs are more beneficial for younger students. However, in another study researchers found differences in social studies grades for middle school students who regularly attended afterschool programs, but they found no differences in grades for elementary students who attended programs (Dynarski et al., 2004). Based on these studies, it seems that grade level may explain some of the differences in outcomes from afterschool programs. However, it is unclear whether participation in afterschool programs in the early grades is more, less, or equally as beneficial as participation in the later grades.

Socioeconomic status is another demographic variable to consider. It has been postulated that students who are at-risk or who live in poorer neighborhoods benefit more from afterschool programs because the programs serve as a protective factor against greater safety risks in these areas, and there are fewer afterschool options for these students compared to middle class students (Mahoney, Larson, et al., 2005). Evaluations of programs who serve only low-income or at-risk children have shown positive academic outcomes (Hock et al., 2001; Posner and Vandell, 1994) whereas studies involving middle class children or economically heterogeneous populations have shown no statistically significant results in academic outcomes (Vandell & Corasaniti, 1988). Pettit, Laird, Bates, and Dodge (1997) found that socioeconomic status and gender were moderators for the impact of various types of afterschool care. Related demographic variables that may result in different academic outcomes for students in afterschool programs are family characteristics, such as maternal education and neighborhood characteristics (Riggs & Greenberg, 2004a).

Another individual difference that affects academic outcomes is program attendance, which could also be described as the dosage of the intervention. An evaluation of the TASC afterschool program shows that those who attend programs the most consistently and for the longest period of time experienced the greatest gains in mathematics as assessed by standardized achievement tests (Welsh et al., 2002). Miller's (2003) overview of afterschool program results also found a link between positive academic outcomes and participation levels. Students who attended programs regularly for months or even years showed greater benefits than those who attended sporadically.

Finally, study design issues are a third variable to consider when examining academic outcomes from afterschool programs. Many afterschool program evaluations have not used

comparison groups, so it is unknown whether differences in outcomes are a result from the intervention or from natural maturation and development (Riggs & Greenberg, 2004a). Similarly, many studies have not used a baseline measurement to control for prior academic performance, which also limits the conclusions that can be made about the program's impact (Kane, 2004). Another explanation for differences in afterschool program outcomes is the multiple ways that program participation or program attendance has been measured. In some studies, attendance is defined as being at the program for at least 30 days of the school year (Dynarski, et al., 2004), whereas others have defined more specific categories of attendance: 30-59 days; 60-89 days; and 90 or more days (Jenner & Jenner, 2007). Finally, some studies have been designed with unrealistically high expectations for results considering the limited time students spend in afterschool programs. Kane (2004) proposes that the size of the impact of the program should be commensurate with the nature of the program being evaluated.

2.5 RATIONALE FOR THIS STUDY

While most research on afterschool programs has shown positive behavioral benefits for youth, the results on academic outcomes have been mixed. The focus of this study is academic outcomes to add to the discussion discerning whether there is a relationship between attending a school-based afterschool program and academic outcomes, specifically examining mathematics and reading achievement. Since previous research has shown mixed results based on program and group differences, program site, grade level, and gender will be examined in this study to determine if they result in different academic outcomes for afterschool participants. Attendance

at the afterschool program will be considered and narrowly defined to provide more specification and understanding about the issue of dosage in afterschool outcomes research.

The following definitions are included to provide clarity to the study.

Participants: Students who attended at least one day of the afterschool program. Two afterschool program sites were included in this study at two separate charter schools that were run by the same charter school organization. The afterschool programs were run collaboratively, even though they were at different sites.

Nonparticipants: Students who attended one of the two charter schools but who did not participate in the afterschool program.

Subject specific attendance: Afterschool program attendance was calculated as the total number of days students attended when specific instruction for reading and mathematics was scheduled. Reading activities were offered two days a week, and mathematics activities were offered one day a week. Each student has a different reading program attendance rate and a different mathematics program attendance rate.

Regular afterschool attendance: In this study, students were considered to have regular afterschool attendance if they attended the subject specific (i.e., reading or mathematics) portion of the afterschool program for at least 50% of the time.

2.6 RESEARCH QUESTIONS AND HYPOTHESES

1. Do elementary and middle school students who regularly attend school-based afterschool programs show greater academic gains than students at the same schools who do not attend the school-based afterschool programs?

2. For elementary and middle school students who regularly attend a school-based afterschool program, are there variations in academic outcomes based on gender, grade level, or program site?

3. Is the afterschool program attendance rate at a school-based afterschool program related to academic outcomes?

There are three main study expectations. First, afterschool program participants will have greater academic gains on mathematics and reading test scores than nonparticipants. Some studies have found differences between afterschool participants and nonparticipants when outcomes are analyzed for students who have higher program attendance rates, so this analysis will compare only students with subject specific program attendance of at least 50% to nonparticipants. Considering that some studies have not found differences in academic outcomes for participants and nonparticipants and that expectations for afterschool outcomes need to be commensurate with the amount of time and focus of the intervention, this question will be measured at the alpha level of .05, since it is unlikely that differences would be found at a higher level of significance.

Second, it is expected that there will be no differences in academic outcomes by gender or program site, but there will be variations based on grade level. In previous research, few differences have been found in outcomes from afterschool programs based on gender, so this variable will be included to provide us with more understanding. It is expected that students attending programs at the two different sites will not have variation in their academic gains. Even though prior research has found differences at program sites, those differences were at sites that had separate leadership. Both of these afterschool program sites are being run by one organization and the school populations from both sites are similar, so differences are not

expected. It is expected that students in the lower grades will show greater gains than students in the upper grades.

Third, it is expected that by defining attendance more narrowly rather than simply considering program participation as a dichotomous variable, students with higher program attendance will show greater academic gains than students with lower program attendance rates. A subject specific (i.e., reading or mathematics) measurement of program attendance will be used to provide a more precise measurement of the dosage of the intervention.

3.0 METHOD

3.1 RESEARCH DESIGN

In social science research, many propose that randomized controlled experiments are the best method to study whether an intervention causes change in students. While randomizing increases internal validity by increasing the researcher's ability to infer that treatment outcomes resulted from the intervention, in many real world situations randomization cannot occur. People self-select into programs and services and they utilize them or do not utilize them for a variety of reasons (McCall & Green, 2004). When a study is randomized and the change in groups of participants can be attributed to the intervention, the external validity may be weakened because of the study conditions that were necessary for randomization to occur. For example, people who choose to be in a research study where they will receive some form of reimbursement may not be the same people who would choose to participate in an afterschool program, where they may not receive a financial benefit and may even need to pay for the program. McCall and Green (2004) summarize a variety of reasons outlining why methods such as quasi-experimental designs have value for research in addition to what is learned through randomized experiments.

The design of this quasi-experiment was a nonequivalent comparison group design with a pretest and a posttest. While the internal validity of this design was not as high as a randomized design, this study included features that attempted to eliminate alternate explanations for possible

differences in the academic outcomes. First, students' pre-intervention academic achievement was considered by using a difference score between the posttest and the pretest. Kane (2004) proposed that it is best to control variables related to the outcome, and since this study was examining academic outcomes, it was essential to consider baseline academic achievement. Second, many researchers have proposed that poor measurement of the dosage of the intervention has brought about suspect results for afterschool program outcomes. In previous studies, researchers measured afterschool participation either as a dichotomous variable, participation or nonparticipation or as the total number of days of participation, without defining a more exact measure of the amount of time actually spent receiving specific academic assistance. This study used a more precise definition of program attendance to better examine any differences in academic outcomes. Rather than measuring program attendance as the total number of days in the program, attendance was measured as the number of days in subject specific instruction. The reading, writing, and mathematics enrichment activities were offered only on certain days of the week, so for each student a separate reading program attendance, which included the reading and writing instruction, and a mathematics program attendance were calculated.

3.2 PARTICIPANTS

Participants in this study attended one of two charter schools in Pittsburgh, Pennsylvania. While the charter schools were in two different locations, they were both run by the same organization, and they had similar structures and curricula. The schools were both located in at-risk communities. School H was in a community that has a 28% poverty rate, and 18% of the

community's residents were high school dropouts. School M was in a community that has a 38% poverty rate and 19% of the community's residents were high school dropouts. Table 2 through Table 5 provide student demographic information for each school including gender, ethnicity, IEP status, and low-income status. From these tables, it can be seen that School H had a higher percentage of students with IEPs than School M. Both schools had similar numbers of boys and girls, and both schools served a majority of students who qualified for free or reduced-cost lunch. School H had more African-American students than School M, and School M had more Caucasian students than School H.

Since the No Child Left Behind Act was passed in 2001, schools that receive federal funds are measured each year on how well their students perform on standardized achievement tests. Adequate Yearly Progress (AYP) is the term used to describe whether the schools are progressing sufficiently to have all students reach proficiency by the 2013-2014 school year. School M made AYP in the 2007-2008 school year, the year prior to this study. School H did not, because it missed target percentages for students with Individualized Educational Plans (IEPs) on the state's reading and mathematics tests. Both schools made AYP for the 2008-2009 school year, the year of this study.

Participants and nonparticipants were drawn from students in third grade through eighth grade at School H and from third grade through seventh grade at School M, which did not have an eighth grade class yet. School M began as a school that enrolled only students in kindergarten through fifth grade, and it was adding one additional grade level each year until it would include kindergarten through eighth grade. Consent for involvement in the study was received when parents registered their students for the charter schools and for the afterschool programs. The

research was conducted in an established educational setting involving normal educational practices.

The afterschool programs had 188 participants during the 2008-2009 school year, 106 at School H and 82 at School M. Of this group, 94 were in kindergarten through second grade. Since the dependent variable of this study was being measured by the 4Sight tests, which are administered only to third-grade through eighth-grade students, students in kindergarten through second grade were not included in this study. Also, there were nine students in third through eighth grade who started the afterschool program after February 20, 2009, which was when the 4Sight posttest was administered, so these students were eliminated from the afterschool participant group.

Table 6 through Table 9 provide detailed demographic information for the remaining 85 afterschool participants. From these tables, it can be seen that the afterschool participants at School H had more IEPs than the afterschool participants at School M. Both programs enrolled more males than females, both programs served a majority of students who qualified for free or reduced-cost lunches, and both programs served a majority of African-American students. A goodness-of-fit test was conducted to test whether the afterschool participants reflected demographic characteristics similar to the general student population. The afterschool participants and the nonparticipants did not differ on gender, ethnicity, IEP status, and low-income status (all tested at the .10 level). However, because parents enroll students in afterschool programs for a wide variety of reasons that are not measured here, it cannot be assumed that the participants and nonparticipants are equal. As others have observed, families choose different afterschool arrangements for a variety of reasons which could make the afterschool participants

intrinsically different from those who do not attend afterschool programs (Mahoney, Lord, et al., 2005; Posner & Vandell, 1994).

Table 2.
Frequency Distribution for all Students at Both Schools by Curriculum Code

	School H		School M		Cumulative	
Curriculum Code	*N*	%	*N*	%	*N*	%
Regular Education	167	77.7	162	84.8	329	81.0
IEP	48	22.3	29	15.2	77	19.0
Total	*N*=215	100.0	*N*=191	100.0	*N*=406	100.0

Table 3.
Frequency Distribution for all Students at Both Schools by Gender

	School H		School M		Cumulative	
Gender	*N*	%	*N*	%	*N*	%
Females	113	52.6	91	47.6	215	50.2
Males	102	47.4	100	52.4	191	49.8
Total	*N*=215	100.0	*N*=191	100.0	*N*=406	100.0

Table 4.
Frequency Distribution for all Students at Both Schools by Income Code

	School H		School M		Cumulative	
Income Code	*N*	%	*N*	%	*N*	%
Free Lunch	175	81.4	152	79.6	327	80.6
Reduced-Cost Lunch	20	9.3	17	8.9	37	10.3
Not Low-income	20	9.3	22	11.5	42	9.1
Total	*N*=215	100.0	*N*=191	100.0	*N*=406	100.0

Note. Students qualify for free lunches if their family income is 130% or less of the federal poverty level, and they qualify for reduced-cost lunches if their family income is 130%-185% of the federal poverty level.

Table 5.
Frequency Distribution for all Students at Both Schools by Ethnic Code

	School H		School M		Cumulative	
Ethnic Code	*N*	%	*N*	%	*N*	%
African-American	180	83.7	117	61.3	297	73.2
Multicultural	23	10.7	23	12.0	46	11.3
Caucasian	11	5.1	49	25.7	60	14.8
Other	1	.5	2	1.0	3	.7
Total	*N*=215	100.0	*N*=191	100.0	*N*=406	100.0

Table 6.
Frequency Distribution for Afterschool Participants by Curriculum Code

	School H		School M		Cumulative	
Curriculum Code	*N*	%	*N*	%	*N*	%
Regular Education	38	76.0	30	85.7	68	80.0
IEP	12	24.0	5	14.3	17	20.0
Total	*N*=50	100.0	*N*=35	100.0	*N*=85	100.0

Table 7.
Frequency Distribution for Afterschool Participants by Gender

	School H		School M		Cumulative	
Gender	*N*	%	*N*	%	*N*	%
Females	22	44.0	15	42.9	37	43.5
Males	28	56.0	20	57.1	48	56.5
Total	*N*=50	100.0	*N*=35	100.0	*N*=85	100.0

Table 8.
Frequency Distribution for Afterschool Participants by Income Code

	School H		School M		Cumulative	
Income Code	*N*	%	*N*	%	*N*	%
Free Lunch	37	74.0	25	71.4	62	72.9
Reduced-Cost Lunch	5	10.0	4	11.4	9	10.6
Not Low-income	8	16.0	6	17.1	14	16.5
Total	*N*=50	100.0	*N*=35	100.0	*N*=85	100.0

Note. Students qualify for free lunches if their family income is 130% or less of the federal poverty level, and they qualify for reduced-cost lunches if their family income is 130%-185% of the federal poverty level.

Table 9.
Frequency Distribution for Afterschool Participants by Ethnic Code

	School H		School M		Cumulative	
Ethnic Code	*N*	%	*N*	%	*N*	%
African-American	40	80.0	23	65.7	63	74.1
Multicultural	6	12.0	3	8.6	9	10.6
Caucasian	3	6.0	8	22.9	11	12.9
Other	1	2.0	1	2.9	2	2.4
Total	*N*=50	100.0	*N*=35	100.0	*N*=85	100.0

3.3 RECRUITMENT

To recruit students for the afterschool program, letters were sent home in the summer of 2008 to all families of students who attended the charter schools, and applications for the afterschool program were available for families to register their children. Flyers were distributed at mandatory parent meetings at the beginning of the year, and an open house event was held after the school year started for parents to register their children. Once school started, flyers were sent home with children who demonstrated academic need, and teachers from the school encouraged parents of children with academic need to register them for the program.

School H reached its capacity of 80 students for the afterschool program and started a waiting list. As students dropped out of the program, students from the waiting list were allowed to register for the program, with preference being given to students with greater academic need. School M initially enrolled 55 students, but it had a capacity of 80 students. This site continued

to recruit students for the afterschool program into the school year. The site director speculated that more children did not enroll because of transportation issues. The afterschool program did not provide transportation and students needed to be picked up from the program by a parent or guardian. Many of the students lived far from the school and if parents were working, they may not have been able to pick up their children from the afterschool program, so they relied on the bus to bring their children home immediately after school. Afterschool participants were required to attend the program an average of three days a week to remain enrolled in the program.

3.4 DESCRIPTION OF THE AFTERSCHOOL PROGRAM

The afterschool program was run collaboratively between a local foundation and a charter school organization, and it was funded by a 21st CCLC grant administered by the Pennsylvania Department of Education. The purposes of 21st CCLC programs are to assist students in meeting state and local standards in reading and mathematics, to offer students a wide variety of enrichment activities to complement academic programs, and to offer educational services to families of students who participate in the programs (United States Department of Education, 2009). In Pennsylvania, the 21st CCLCs focus on providing academic enrichment activities to assist youth in meeting state standards for core academic subjects. Centers are also encouraged to provide supplemental activities such as music, art, recreation, character education, and technology education, and they may provide educational services for families of participating students which could include literacy instruction, computer training, or cultural enrichment. One focus of Pennsylvania 21st CCLCs is for programs to have strong youth and family involvement

in decision making. A second characteristic of Pennsylvania 21st CCLCs is for centers to develop connections between the school and the community.

The charter school organization had four K-8 schools throughout the region in the 2008-09 school year and one high school. This afterschool program had two sites, at two of the four K-8 schools. If students attended the afterschool program, they attended the site located at their school. This was the first year of full implementation for the afterschool program. The program ran in close conjunction with the school calendar and included approximately 155 days of afterschool programming. Students participated in structured program components from 3:30 p.m. until 6:00 p.m. Mondays through Fridays. Mondays through Thursdays the schedule included academic activities and Fridays were special event days, where guests such as a storyteller came to visit or where kids participated in creative games or activities. For the typical weekly program schedule, see Table 10. At School H, the class breakdown was K-2, 3-4, 5-6 and 7-8. At School M, the class breakdown was K, 1-2, 3-4 and 5-7.

Table 10.
Typical Weekly Afterschool Program Schedule

Time	Monday	Tuesday	Wednesday	Thursday	Friday
3:30-4:00 PM	Snack	Snack	Snack	Snack	Snack
4:00-5:00 PM	Reading	Mathematics	Homework/ Enrichment activities	Writing	Special events
5:00-6:00 PM	Homework	Homework	Enrichment activities/ Homework	Homework	Special events

The design of the afterschool program was primarily academic. Each day, students spent one hour working on homework or supplemental education activities. During homework time, the students worked independently or in small groups, receiving assistance from staff as needed. If their homework was completed, they worked on supplemental education activities that might include practice in an area where they were below desired performance or in an area that they needed to strengthen a skill. Some examples of these activities were book reviews, educational games, and an online software program called Apangea. The activities of the homework time were also determined by individualized learning plans, which are described in greater detail below. One hour a week of specialized instruction was devoted to each of the following subjects: reading comprehension, mathematics, and writing. During this time, students participated in lessons that the teachers or site directors planned. The lessons were created based on weaknesses that were seen in students' individual or group assessment data and/or from the Pennsylvania state standards for that particular subject. Once a week for an hour students participated in general enrichment activities, which could be cultural, artistic, creative, nutritional, or social activities. Some examples of these activities were cartoon drawing, karate, Brazilian martial arts, and theater.

Even though the afterschool program sites had similar program goals and designs, they had variations in program implementation and in staffing. At School H, the program director wrote individual learning plans for every student in the program. The plan included three components: assessment results, improvement goals, and intervention. In the assessment section, it included students' scores on standardized assessments that the students took during the school day, such as the 4Sight tests and the Measures of Academic Progress (MAP) tests. The school provided the assessment information to the afterschool program's site director. While these

assessment results provided general information about how a student had performed in reading or mathematics, they did not provide specific information about areas where the students' skills were below the desired progress. The site director of the afterschool program also administered assessments that she had developed using exact examples from the Pennsylvania state standards for subject areas. The results of these assessments gave her more specific information, such as whether the student was struggling with reading fluency or with adding two-digit numbers, which was then used in the individual learning plans. The second section outlined specific improvement goals for the student, including space for how the goal would be measured and at what date. The third section of the plan was entitled Intervention and included interventions such as small-group tutoring, one-on-one tutoring, computer assisted programs, and homework assistance. This section included space for the staff person to determine the amount of time spent on the intervention activities and the people responsible for leading the activities. Students, parents, and the site director were all aware of the individual learning plans and they each signed the plan agreeing to fully participate in the intervention program.

At School M, the site director did not create individual plans for all students but only for those who had Individualized Education Plans (IEPs) from the school. These academic improvement plans listed a specific goal that the child was working on with a projected completion date. For example, the plan for a child with a speech difficulty might be to work towards the goal of correctly pronouncing words that end with the letters T, B, and D. The plan included a section that outlined the afterschool program staff's responsibilities in assisting the child to reach the goal. It also had a three-week calendar in which staff listed specific activities that were completed to assist the child in reaching the goal.

The curriculum during the specialized instruction time varied by site, although the general topics of reading comprehension, writing, and mathematics were the same at both sites. At School H, the reading time involved reading stories from a variety of sources, including fiction, nonfiction, newspapers, and magazines, and answering questions about the material that was read. The writing time was connected to the story or topic from the reading time, and it might include journaling a reflection about the reading. The writing time also included sentence structure activities and grammar activities, such as an antonyms and synonyms game. In February, the students used the reading and writing time to research a famous African-American, but not one who is typically covered in African-American history month. The students developed a monologue for their character, and a local professional came in to teach them about acting and voice projection, so that they could deliver their monologues for a performance. The mathematics time consisted of hands-on mathematics games and activities, again that were developed based on areas of weakness as seen in the students' assessment data or based on the Pennsylvania state standards.

At School M, the reading time included reading stories aloud and book discussions. It focused on creative activities that encouraged children to use their imaginations. For example, in one lesson the class discussed aliens, and students created their own alien creatures. The writing time included journal writing and other activities to strengthen research and writing skills. For example, students rotated through three 20-minute activities that included an online scavenger hunt, a spelling activity, and a game with parts of speech. One of the primary activities of the writing time was a newspaper about the afterschool program, where students developed writing and research skills through interviews, conducting surveys, and summarizing the information they gathered in the surveys. The specialized mathematics instruction included hands-on

activities and games. Students in third grade and above worked on a mathematics software program. They also rotated through stations where they did activities such as story problems, money skills, and a greater than/less than activity.

Both afterschool program sites had regular communication with staff from the school, whether it was to design an intervention for a student or to share assessment information. The afterschool program at School H had five staff members who were also school staff members and the program at School M had two staff members who were also school staff members. The afterschool program site directors communicated with the teachers from the school as needed. School M had trimester meetings with the Reading Coach and Mathematics Coach from the school. Afterschool program staff had access to students' school day academic information and assessment information. The staff to student ratio at the afterschool programs was no greater than 12 students to one staff member.

3.5 DATA COLLECTION PROCEDURES

As previously stated, this study is a secondary data analysis, utilizing data that were collected as part of a program evaluation for the afterschool program. The charter school staff and the afterschool program staff collected the data during the 2008-09 school year. An application to conduct research was submitted to the University of Pittsburgh Institutional Review Board (IRB) and was approved. Table 11 displays a summary of the data source, the data description, and the time when the data were collected. The data that were collected included demographic data on the students, afterschool program attendance, and 4Sight pretests and posttests. The 4Sight tests were administered during the regular school day to all students in grades 3 through 8 attending

the charter schools. More data were collected for the program evaluation, including the school day attendance, the number and type of school day discipline issues, the number of afterschool discipline issues, and the Measures of Academic Progress (MAP) test. Since there were concerns with the interpretation and use of the MAP data, it was not used for this study. Only the data that are relevant to this study are described in Table 11.

Table 11.
Data Collection Table

Data Source	Time Collected	Description of Data
Demographic Data	The charter school staff collected this information at various points throughout the 2008-2009 school year.	These data included the ethnicity, gender, grade level, school site, regular education or IEP, and the students' free or reduced-cost lunch status.
Afterschool program attendance	The afterschool program staff collected this information daily throughout the 2008-2009 school year.	These data included the specific dates that students were present at the afterschool program. From this information, a subject specific attendance was calculated for each student in reading and mathematics. The reading attendance included the days when reading and writing instruction was offered.
4Sight tests	4Sight pretest: August 26-27, 2008 4Sight posttest: February 17-20, 2009	These data included a reading and mathematics scaled score and a categorical score for each test administration date.

3.6 MEASURES

The 4Sight benchmark assessments are tests designed by the Success For All Foundation to be predictive of how students would perform on the Pennsylvania System of School Assessment (PSSA) test if students took the PSSA that day. The tests allow teachers to collect information that can be helpful in shaping student instruction based on areas where students show deficiencies (Success For All, 2008). 4Sight assessments are available in many states, but the tests vary from state to state based on a state's academic content standards. The content for the Pennsylvania 4Sight tests was developed by examining Pennsylvania reading and mathematics rubrics and scoring guides, released state assessments, and practice items. From those materials, the Success For All Foundation created a blueprint for the 4Sight benchmarks that was closely aligned with the PSSA. For grades 3 through 8, the current benchmarks for mathematics were piloted in the spring of 2006 and the current benchmarks for reading were piloted in the spring of 2007. All forms were re-correlated with spring 2008 PSSA scores to keep them current.

Schools are provided with student scores that include a total number of correct responses for each specific subject area and a total number of correct responses within each subscale, which are the same reporting categories that are used for the PSSA. The PSSA mathematics assessment has five reporting categories: numbers and operations, measurement, geometry, algebraic concepts, and data analysis and probability. The PSSA reading assessment has five reporting categories: comprehension and reading skills, interpretation and analysis of fictional and nonfictional text, learning to read independently, reading critically in all content areas, and reading, analyzing, and interpreting literature. This information is provided to assist teachers in knowing where to emphasize instruction and to assist districts with professional development. Examples of the content covered in the subscales for the fifth-grade reading and mathematics

tests are included in Appendixes B and C. A student's raw score generates a predicted scaled score on the state assessment and a categorical score that aligns with the four state performance levels of Below Basic, Basic, Proficient, and Advanced.

The 4Sight test is a one-hour assessment that consists primarily of multiple choice items, but it also includes some open-ended response items. In this study, teachers from the two charter schools scored the open-ended items using the state specific rubric after they had received training to ensure inter-rater reliability. Using data from the 2006-2007 and 2007-2008 school years, the inter-form reliability of the 4Sight tests for grades 3 through 8 yielded Pearson correlation coefficients ranging from .73 to .76 for reading and .77 to .83 for mathematics. Concurrent validity was established by comparing spring 2008 scores on the 4Sight tests with spring 2008 PSSA scores, and the correlations ranged from .81 to .88 for grades 3-8 in reading and from .77 to .83 for grades 3-8 in mathematics. A number of recent studies have also found support for the claim that 4Sight tests predict the PSSA scores. Stoltz (2008) found that the 4Sight benchmark reading test was a significant predictor of PSSA scores for students in grade 5. Castagna (2008) found that the 4Sight mathematics and reading tests were predictive of how students in grades 6 through 8 would perform on the PSSA.

The PSSA is a "standards-based, criterion-referenced assessment measuring student attainment of the [Pennsylvania] Academic Standards while simultaneously determining the extent to which school programs enabled students to achieve proficiency of the Academic Standards" (Data Recognition Corporation, 2009, p. 2). The PSSA increased in importance when the No Child Left Behind Act of 2001 mandated that schools must achieve a minimum amount of improvement each year, also referred to as AYP (Data Recognition Corporation, 2009). The PSSA tests for reading and mathematics are administered each year in grades 3 through 8 and

again in grade 11. The PSSA produces two scores for students, a scaled score and a categorical level. The scaled scores were originally designed to be a school level scaled score, and the mean was arbitrarily set at 1300 with a standard deviation set at 100 (Data Recognition Corporation, 2009). The categorical levels of Below Basic, Basic, Proficient, and Advanced are described in Table 12.

Table 12.
Pennsylvania General Performance Level Descriptors

Categorical Level	Description
Below Basic	The Below Basic Level reflects inadequate academic performance. Below Basic work indicates little understanding and minimal display of the skills included in the Pennsylvania Academic Content Standards. There is a major need for additional instructional opportunities and/or increased student academic commitment to achieve the Proficient Level.
Basic	The Basic Level reflects marginal academic performance. Basic work indicates a partial understanding and limited display of the skills included in the Pennsylvania Academic Content Standards. This work is approaching satisfactory performance, but has not been reached. There is a need for additional instructional opportunities and/or increased student academic commitment to achieve the Proficient Level.
Proficient	The Proficient Level reflects satisfactory academic performance. Proficient work indicates a solid understanding and adequate display of the skills included in the Pennsylvania Academic Content Standards.
Advanced	The Advanced Level reflects superior academic performance. Advanced work indicates an in-depth understanding and exemplary display of the skills included in the Pennsylvania Academic Content Standards.

Note. From *Technical Report for the Pennsylvania System of School Assessment 2008 Reading and Mathematics*, by Data Recognition Corporation, 2009, p. 132.

4.0 FINDINGS

The purpose of this study was to examine differences in academic outcomes between participants and nonparticipants of school-based afterschool programs, to understand how group differences may be related to academic outcomes for afterschool participants, and to understand more about the relationship between afterschool program attendance and academic outcomes.

4.1 RESEARCH QUESTION 1

Do elementary and middle school students who regularly attend school-based afterschool programs show greater academic gains than students at the same schools who do not attend the school-based afterschool programs?

To answer this question, analyses were conducted separately for reading and mathematics using a one-way ANOVA with one between subjects factor (afterschool participation, i.e., participant or nonparticipant) and with the difference between the 4Sight pretest score and the 4Sight posttest score as the dependent variable. Since the focus of this study is to understand whether *regular* attendance at an afterschool program is related to greater academic gains, only students with a subject specific (i.e., reading or mathematics) afterschool attendance rate of 50% or greater were included in this analysis.

Demographic information for the nonparticipants and for the afterschool participants involved in the analysis of mathematics gain scores is presented in Table 13 and Table 14. The nonparticipant group was generated randomly from all nonparticipants by SPSS. As can be seen from the percentages, there were more males than females in the participant group, whereas the nonparticipant group was distributed equally by gender. The participant group had more students who were enrolled at School H, whereas the nonparticipant group had more students who were enrolled at School M. The participant group consisted of more African-American students than the nonparticipant group, and the nonparticipant group consisted of more Caucasian and Multicultural students than the participant group. Seventy percent of the students in the participant group were in grades 3 through 5, whereas the nonparticipant group was divided almost equally between grades 3 through 5 and grades 6 through 8. The nonparticipant group included more students with IEPs than the participant group. A goodness-of-fit test was conducted to test whether the afterschool participants differed from the nonparticipants. The afterschool participants and the nonparticipants did not differ on gender, ethnicity, IEP status, and low-income status (all tested at the .10 level). Afterschool participants' scores on the 4Sight mathematics pretest ranged from 842 to 1429 with a mean of 1081.30. Nonparticipants' scores on the 4Sight mathematics pretest ranged from 866 to 1542 with a mean of 1129.62. Afterschool participants' scores on the 4Sight mathematics posttest ranged from 1064 to 1583 with a mean of 1336.80. Nonparticipants' scores on the 4Sight mathematics posttest ranged from 987 to 1626 with a mean of 1326.64.

Results from a one-way ANOVA indicated a significant difference for afterschool participation for mathematics, $F(1, 88) = 4.16$, $p = .044$ (Table 16). Afterschool participants showed larger gain scores (255.50) on average than the nonparticipants (197.02); however, this

difference is not simply attributable to the variable of afterschool participation. Group differences among participants and nonparticipants are explored further in the analyses in research question 2.

Demographic information for the two groups involved in the analysis of reading scores is presented in Table 13 and Table 15. This nonparticipant group is the same comparison group that was used for the mathematics analysis, and it was generated randomly from all nonparticipants by SPSS. Both the participant and nonparticipant groups had similar numbers of boys and girls and similar numbers of students from different ethnic groups. The participant group included more students from School H, and the nonparticipant group included more students from School M. The participant group had a slightly higher percentage of students in grades 3 through 5 than the nonparticipant group. The nonparticipant group had a higher percentage of students with IEPs. A goodness-of-fit test was conducted to test whether the afterschool participants differed from the nonparticipants. The afterschool participants and the nonparticipants did not differ on gender, ethnicity, IEP status, and low-income status (all tested at the .10 level). Afterschool participants' scores on the 4Sight reading pretest ranged from 845 to 1499 with a mean of 1190.28. Nonparticipants' scores on the 4Sight reading pretest ranged from 988 to 1534 with a mean of 1213.58. Afterschool participants' scores on the 4Sight reading posttest ranged from 986 to 1555 with a mean of 1327.51. Nonparticipants' scores on the 4Sight reading posttest ranged from 919 to 1589 with a mean of 1308.96.

Results from a one-way ANOVA indicated no significant difference for afterschool participation for reading, $F(1, 95) = 2.60$, $p = .110$ (Table 17). Even though the difference is not statistically significant, afterschool participants gain scores were higher (137.23) on average than nonparticipants (95.38). While no differences were found when only considering the variable of

afterschool participation, group differences based on this outcome are explored further in the analyses in research question 2.

It can be seen in Figure 2 and Figure 3 that while the afterschool participants started with lower pretest scores on average than the nonparticipants, they surpassed the nonparticipants in their posttest scores on average in both mathematics and reading. These differences are not characteristics of all afterschool participants, but they can be understood better by examining group differences which are explored in the next section.

Table 13.
Demographic Information for Nonparticipants

	School H	School M	Total sample	
	N=21	*N*=29	*N*=50	
Characteristics	*N*	*N*	*Total N*	*Total Percent*
Gender				
Male	10	15	25	50.0
Female	11	14	25	50.0
Ethnicity				
African-American	19	18	37	74.0
Caucasian	0	7	7	14.0
Multicultural	2	4	6	12.0
Grade Level				
Grade 3	4	9	13	26.0
Grade 4	6	4	10	20.0
Grade 5	3	1	4	8.0
Grade 6	2	7	9	18.0
Grade 7	2	8	10	20.0
Grade 8	4	0	4	8.0
IEP Status				
Regular education	15	23	38	76.0
IEP	6	6	12	24.0

Table 14.
Demographic Information for Afterschool Participants With a 50% or Greater Mathematics Attendance

	School H	School M	Total sample	
	N=23	*N*=17	*N*=40	
Characteristics	*N*	*N*	*Total N*	*Total Percent*
Gender				
Male	12	10	22	55.0
Female	11	7	18	45.0
Ethnicity				
African-American	21	13	34	85.0
Caucasian	1	3	4	10.0
Multicultural	1	1	2	5.0
Grade Level				
Grade 3	5	2	7	17.5
Grade 4	7	8	15	37.5
Grade 5	1	5	6	15.0
Grade 6	0	1	1	2.5
Grade 7	4	1	5	12.5
Grade 8	6	0	6	15.0
IEP Status				
Regular education	19	15	34	85.0
IEP	4	2	6	15.0

Table 15.
Demographic Information for Afterschool Participants With a 50% or Greater Reading Attendance

	School H	School M	Total sample	
	N=25	*N*=22	*N*=47	
Characteristics	*N*	*N*	*Total N*	*Total Percent*
Gender				
Male	13	11	24	51.1
Female	12	11	23	48.9
Ethnicity				
African-American	21	15	36	76.6
Caucasian	1	5	6	12.8
Multicultural	3	1	4	8.5
Other	0	1	1	2.1
Grade Level				
Grade 3	5	2	7	14.9
Grade 4	7	8	15	31.9
Grade 5	1	6	7	14.9
Grade 6	1	3	4	8.5
Grade 7	5	3	8	17.0
Grade 8	6	0	6	12.8
IEP Status				
Regular education	21	19	40	85.1
IEP	4	3	7	14.9

Table 16.
One-Way ANOVA Comparing Mathematics Difference Scores of Afterschool Program Participants and Nonparticipants

Variable	Group	Mean	*SD*
4Sight mathematics pretest	Participants	1081.30	117.93
	Nonparticipants	1129.62	153.31
4Sight mathematics posttest	Participants	1336.80	145.82
	Nonparticipants	1326.64	187.51
Difference score	Participants	255.50	143.49
	Nonparticipants	197.02	128.18

Source	*SS*	*df*	*MS*	*F*	*p*
Between groups	75998.01	1	75998.01	4.16*	.044
Error	1608116.98	88	18274.06		

*p < .05.

Table 17.
One-Way ANOVA Comparing Reading Difference Scores of Afterschool Program Participants and Nonparticipants

Variable	Group	Mean	*SD*
4Sight reading pretest	Participants	1190.28	175.98
	Nonparticipants	1213.58	145.28
4Sight reading posttest	Participants	1327.51	151.66
	Nonparticipants	1308.96	180.54
Difference score	Participants	137.23	129.15
	Nonparticipants	95.38	126.41

Source	*SS*	*df*	*MS*	*F*	*p*
Between groups	42439.57	1	42439.57	2.60	.110
Error	1550234.21	95	16318.26		

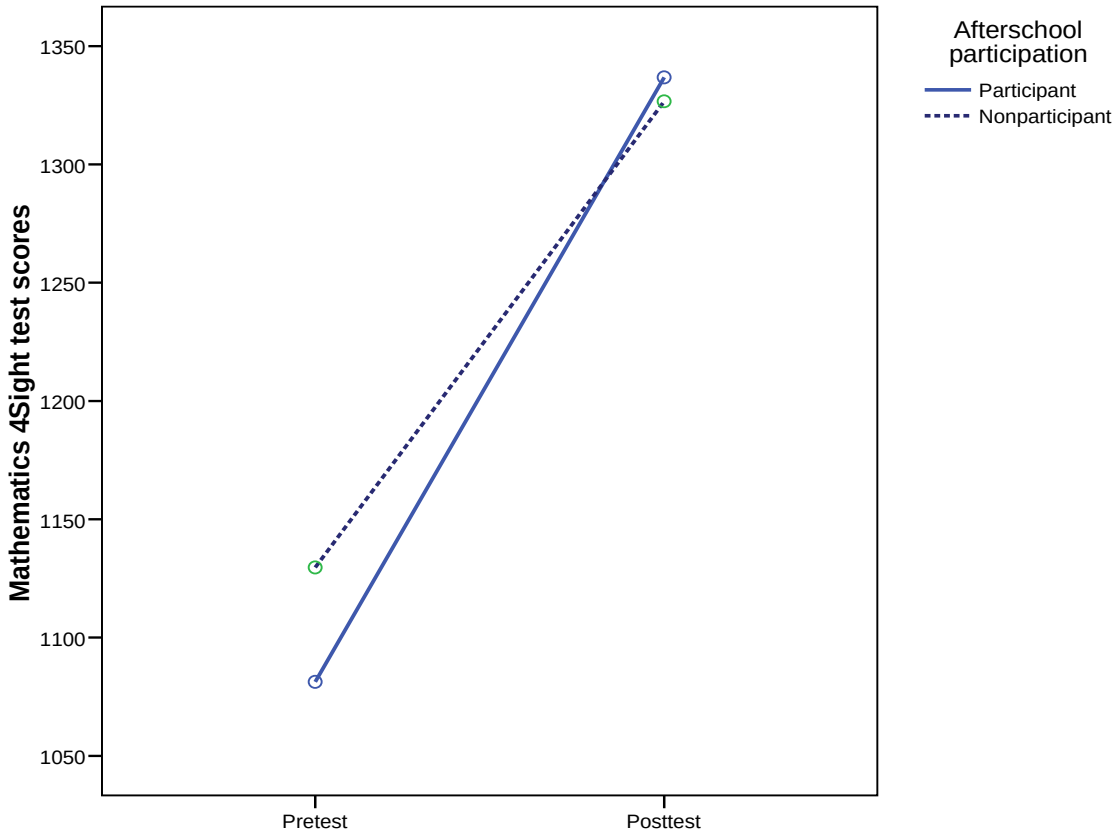

Figure 2. Mathematics pretest and posttest scores for afterschool participants and nonparticipants

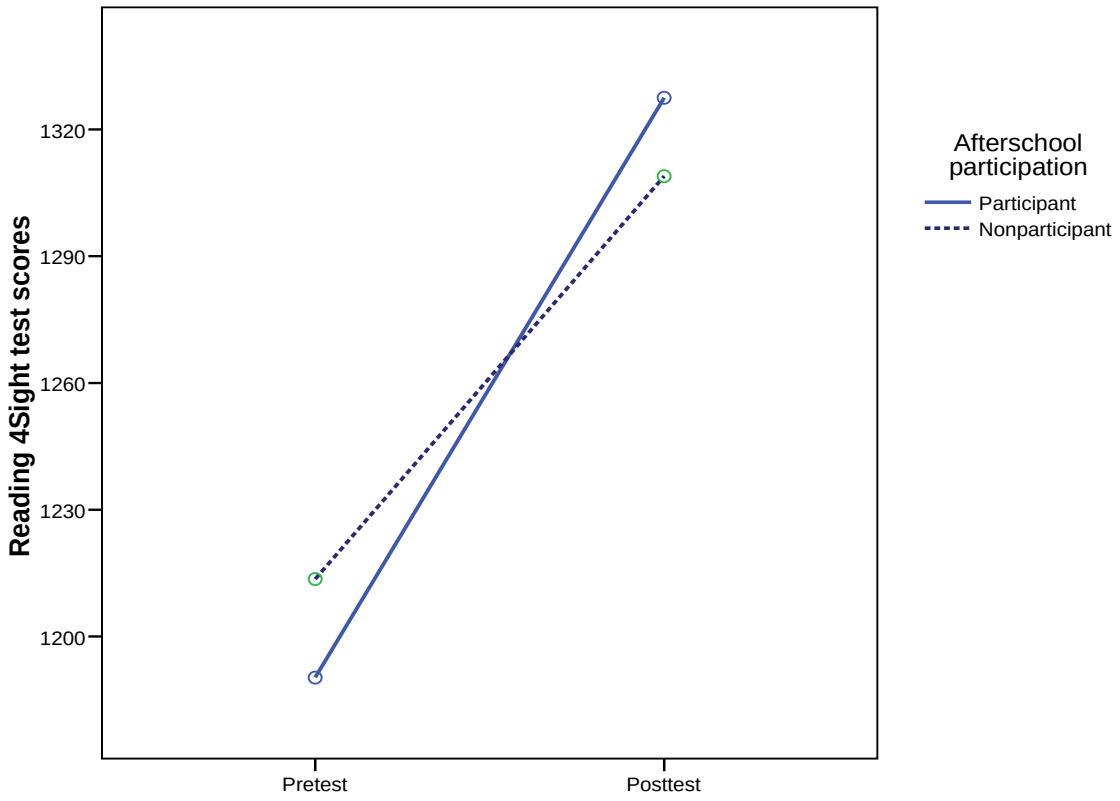

Figure 3. Reading pretest and posttest scores for afterschool participants and nonparticipants

4.2 RESEARCH QUESTION 2

For elementary and middle school students who regularly attend a school-based afterschool program, are there variations in academic outcomes based on gender, grade level, or program site?

Group differences were explored in these analyses to understand whether the effect for academic outcomes related to afterschool program participation is modified by gender, grade level, or program site. Since the focus of this study is to understand whether *regular* attendance

at an afterschool program is related to greater academic gains, only students with a subject specific (i.e., reading or mathematics) afterschool attendance rate of 50% or greater were included in this analysis.

4.2.1 Mathematics Outcomes

4.2.1.1 Gender

Gender was analyzed using a two-way ANOVA with two between subjects factors (afterschool participation and gender). Changes in mathematics scores were examined by using the difference between the 4Sight pretest score and the 4Sight posttest score as the dependent variable. Results indicated no significant main effect for gender, $F(1, 86) = .14$, $p = .705$, no significant main effect for afterschool participation, $F(1, 86) = 3.95$, $p = .050$, and no interaction between gender and afterschool participation, $F(1, 86) = 1.82$, $p = .181$ (Table 18). While the analysis on afterschool participation did not meet the criterion for significance at the .05 level, the *p* value of .050 is close enough to be consistent with the tests conducted in research question 1, which found significance for afterschool participation. Figure 4 illustrates that while the differences were not significant, male participants showed greater gains (268.05) than male nonparticipants (172.16) and female participants (240.17) showed greater gains than female nonparticipants (221.88).

Table 18.
Two-Way ANOVA on Gender and Afterschool Participation for Mathematics Difference Scores

Variable	Group	Mean	*SD*	*N*
Females	Participants	240.17	142.12	18
	Nonparticipants	221.88	94.95	25
Males	Participants	268.05	146.71	22
	Nonparticipants	172.16	152.45	25
Total difference score	Participants	255.50	143.49	40
	Nonparticipants	197.02	128.18	50

Source	*SS*	*df*	*MS*	*F*	*p*
Gender (G)	2635.43	1	2635.43	.14	.705
Afterschool participant (A)	72014.07	1	72014.07	3.95	.050
G X A	33266.50	1	33266.50	1.82	.181
Residual	1569521.46	86	18250.25		

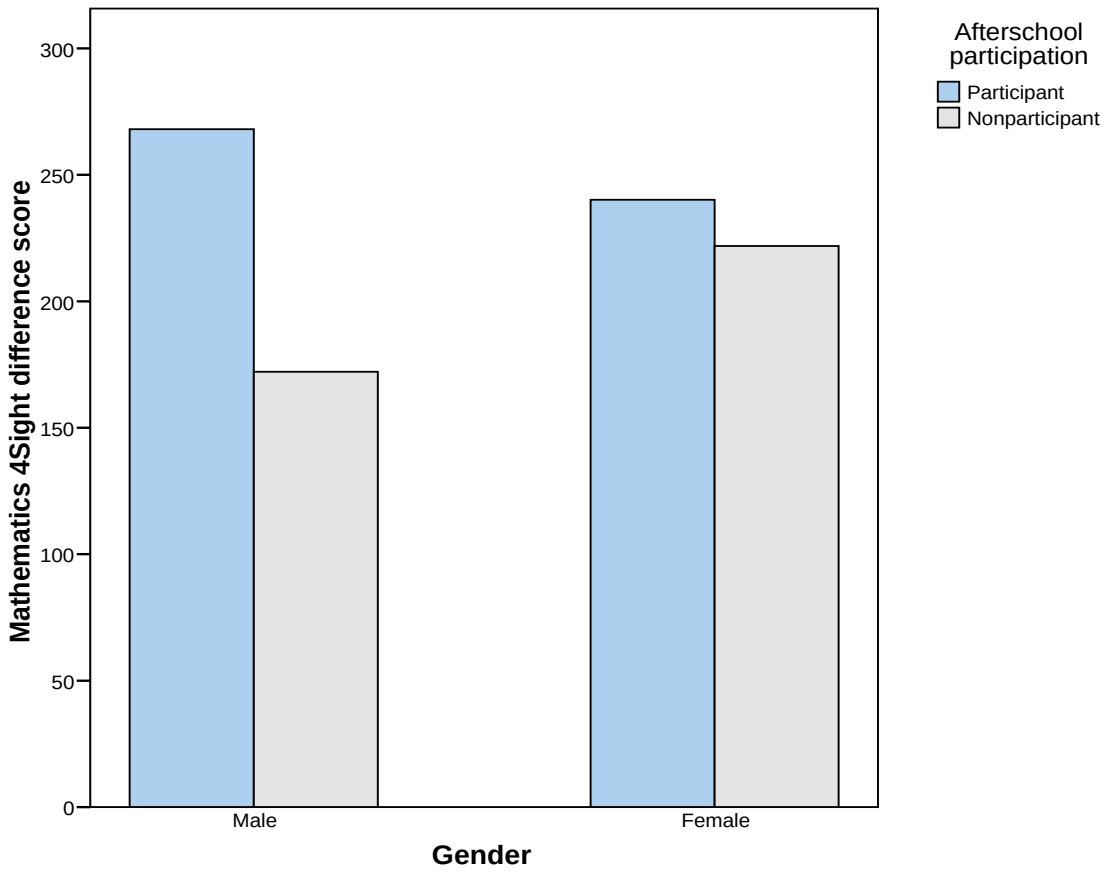

Figure 4. Means of mathematics difference scores comparing afterschool participation and gender

4.2.1.2 Grade Level

Grade level was analyzed using a two-way ANOVA with two between subjects factors (afterschool participation and grade level category, i.e., grades 3-5 or grades 6-8) with mathematics difference scores as the dependent variable. Results yielded a significant interaction between grade category and afterschool participation, $F(1, 86) = 5.12$, $p = .028$ (Table 19). As seen in Figure 5, afterschool participants in grades 3 through 5 had larger difference scores (289.46) than nonparticipants (187.78) in grades 3 through 5, but afterschool participants in

grades 6 through 8 had smaller difference scores (176.25) than their peer nonparticipants (207.87).

Table 19.
Two-Way ANOVA on Grade Category and Afterschool Participation for Mathematics Difference Scores

Variable	Group	Mean	*SD*	*N*
Grades 3-5	Participants	289.46	143.12	28
	Nonparticipants	187.78	116.90	27
Grades 6-8	Participants	176.25	113.74	12
	Nonparticipants	207.87	142.19	23
Total difference score	Participants	255.50	143.49	40
	Nonparticipants	197.02	128.18	50

Source	*SS*	*df*	*MS*	*F*	*p*
Grade category (G)	43453.96	1	43453.96	2.50	.118
Afterschool participant (A)	24600.65	1	24600.65	1.42	.238
G X A	89047.15	1	89047.15	5.12*	.028
Residual	1495436.49	86	17388.80		

* $p < .05$.

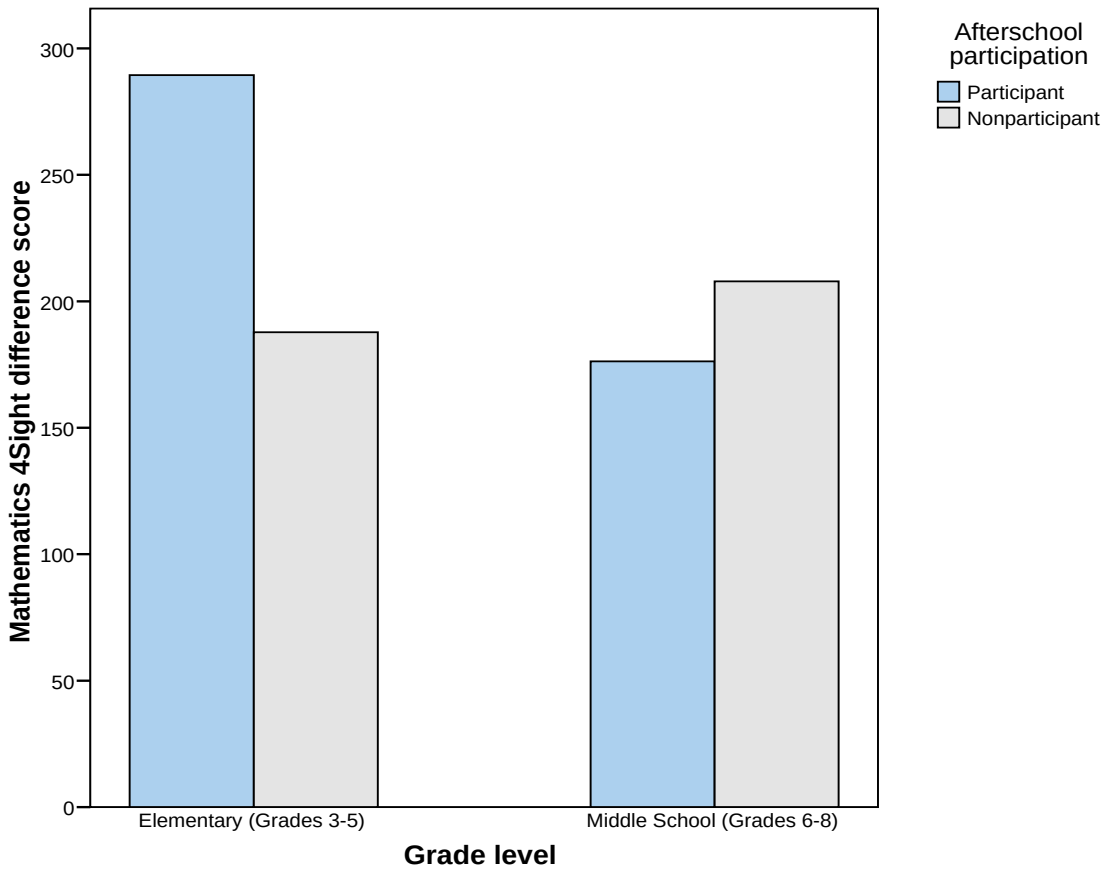

Figure 5. Means of mathematics difference scores comparing afterschool participation and grade level

4.2.1.3 Program Site

Program site was analyzed using a two-way ANOVA with two between subjects factors (afterschool participation and program site, i.e., School H or School M) with mathematics difference scores as the dependent variable. Results yielded a significant interaction between afterschool program participation and program site, $F(1, 86) = 6.62$, $p = .012$ (Table 20). As seen in Figure 6, it is clear that the afterschool participants at School M had larger difference scores (338.94) than the nonparticipants at School M (198.72) and afterschool participants at School H (193.83) had similar differences scores to the nonparticipants at School H (194.67).

Table 20.
Two-Way ANOVA on Program Site and Afterschool Participation for Mathematics Difference Scores

Variable	Group	Mean	*SD*	*N*
School H	Participants	193.83	124.87	23
	Nonparticipants	194.67	155.25	21
School M	Participants	338.94	126.04	17
	Nonparticipants	198.72	107.38	29
Total difference score	Participants	255.50	143.49	40
	Nonparticipants	197.02	128.18	50

Source	*SS*	*df*	*MS*	*F*	*p*
Program site (P)	120672.55	1	120672.55	7.40**	.008
Afterschool participant (A)	105343.92	1	105343.92	6.46*	.013
P X A	107900.56	1	107900.56	6.62*	.012
Residual	1402070.71	86	16303.15		

* $p < .05$. **$p < .01$.

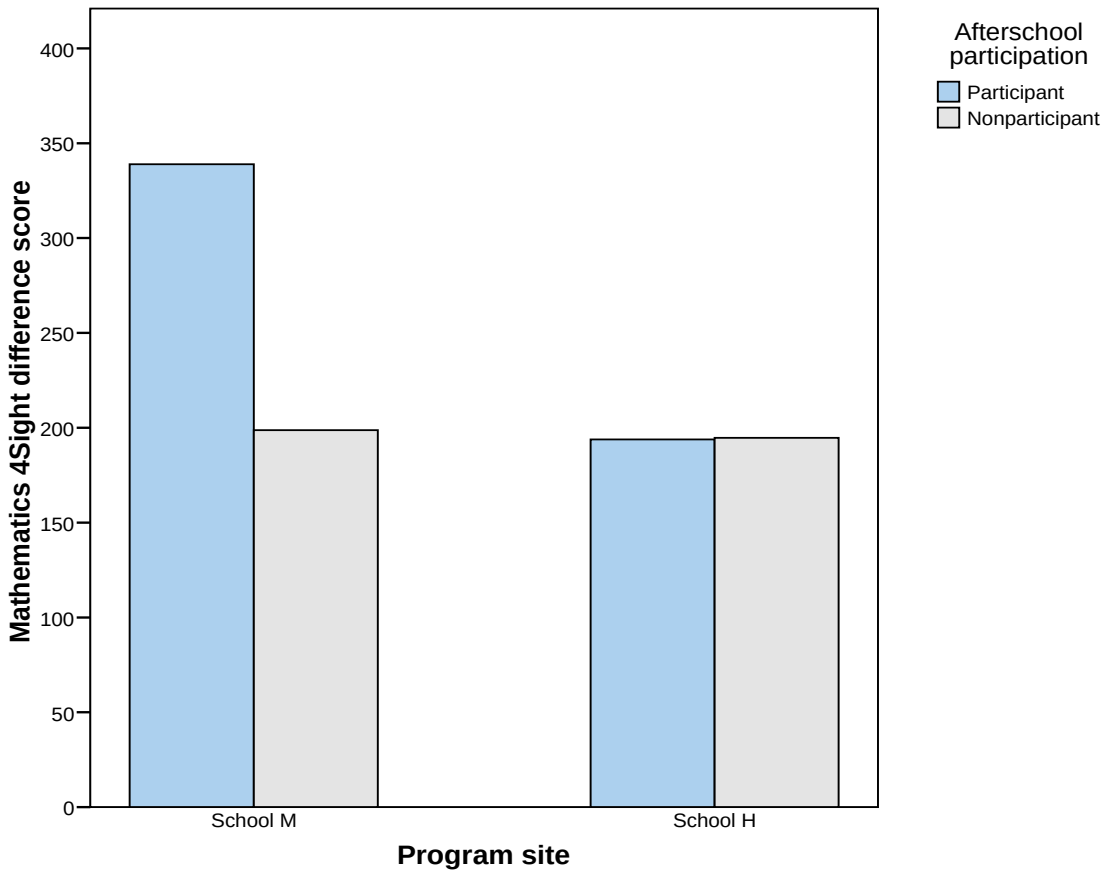

Figure 6. Means of mathematics difference scores comparing afterschool participation and program site

To summarize, no significant differences were found in mathematics outcomes based on gender. Afterschool participants in grades 3 through 5 performed better than their peer nonparticipants whereas afterschool participants in grades 6 through 8 performed not as well as their peer nonparticipants. Afterschool participants at School M outscored nonparticipants at School M whereas afterschool participants at School H did not outscore their nonparticipant peers.

4.2.2 Reading Outcomes

4.2.2.1 Gender

Changes in reading scores were examined using the same method as for mathematics. A two-way ANOVA with two between subjects factors (afterschool participation and gender) was conducted. Results yielded a significant interaction between gender and afterschool participation, $F(1, 93) = 4.43$, $p = .038$ (Table 21). As seen in Figure 7, male participants had larger gain scores (177.79) than male nonparticipants (83.20) whereas female participants had smaller gain scores (94.91) than female nonparticipants (107.56).

Table 21.
Two-Way ANOVA on Gender and Afterschool Participation for Reading Difference Scores

Variable	Group	Mean	*SD*	*N*
Females	Participants	94.91	119.28	23
	Nonparticipants	107.56	111.87	25
Males	Participants	177.79	127.45	24
	Nonparticipants	83.20	140.72	25
Total difference score	Participants	137.23	129.15	47
	Nonparticipants	95.38	126.41	50

Source	*SS*	*df*	*MS*	*F*	*p*
Gender (G)	20735.90	1	20735.90	1.32	.254
Afterschool participant (A)	40660.86	1	40660.86	2.59	.111
G X A	69636.55	1	69636.55	4.43*	.038
Residual	1462143.94	93	15721.98		

* $p < .05$.

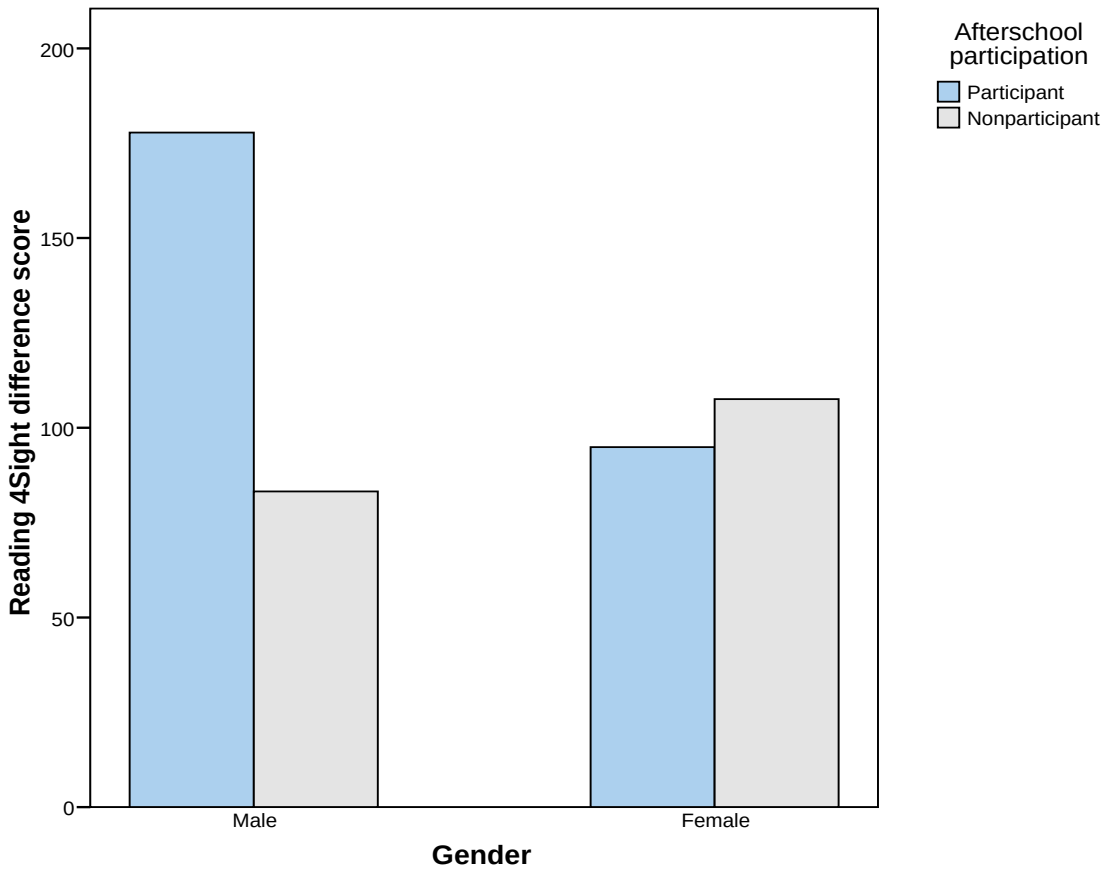

Figure 7. Means of reading difference scores comparing afterschool participation and gender

4.2.2.2 Grade Level

Grade level was analyzed using a two-way ANOVA with two between subjects factors (afterschool participation and grade level category, i.e., grades 3-5 or grades 6-8) with reading difference scores as the dependent variable. Results yielded a significant interaction between grade category and afterschool participation, $F(1, 93) = 9.20$, $p = .003$ (Table 22). Afterschool participants in grades 3 through 5 showed greater gain scores (186.03) than nonparticipants

(84.26) in grades 3 through 5, but afterschool participants in grades 6 through 8 had smaller gain scores (58.61) than their peer nonparticipants (108.43), which is illustrated in Figure 8.

Table 22.
Two-Way ANOVA on Grade Category and Afterschool Participation for Reading Difference Scores

Variable	Group	Mean	*SD*	*N*
Grades 3-5	Participants	186.03	130.95	29
	Nonparticipants	84.26	141.53	27
Grades 6-8	Participants	58.61	79.26	18
	Nonparticipants	108.43	107.65	23
Total difference score	Participants	137.23	129.15	47
	Nonparticipants	95.38	126.41	50

Source	*SS*	*df*	*MS*	*F*	*p*
Grade category (G)	62503.03	1	62503.03	4.27*	.042
Afterschool participant (A)	15824.72	1	15824.72	1.08	.301
G X A	134750.74	1	134750.74	9.20**	.003
Residual	1362644.08	93	14652.09		

* $p < .05$. ** $p < .01$.

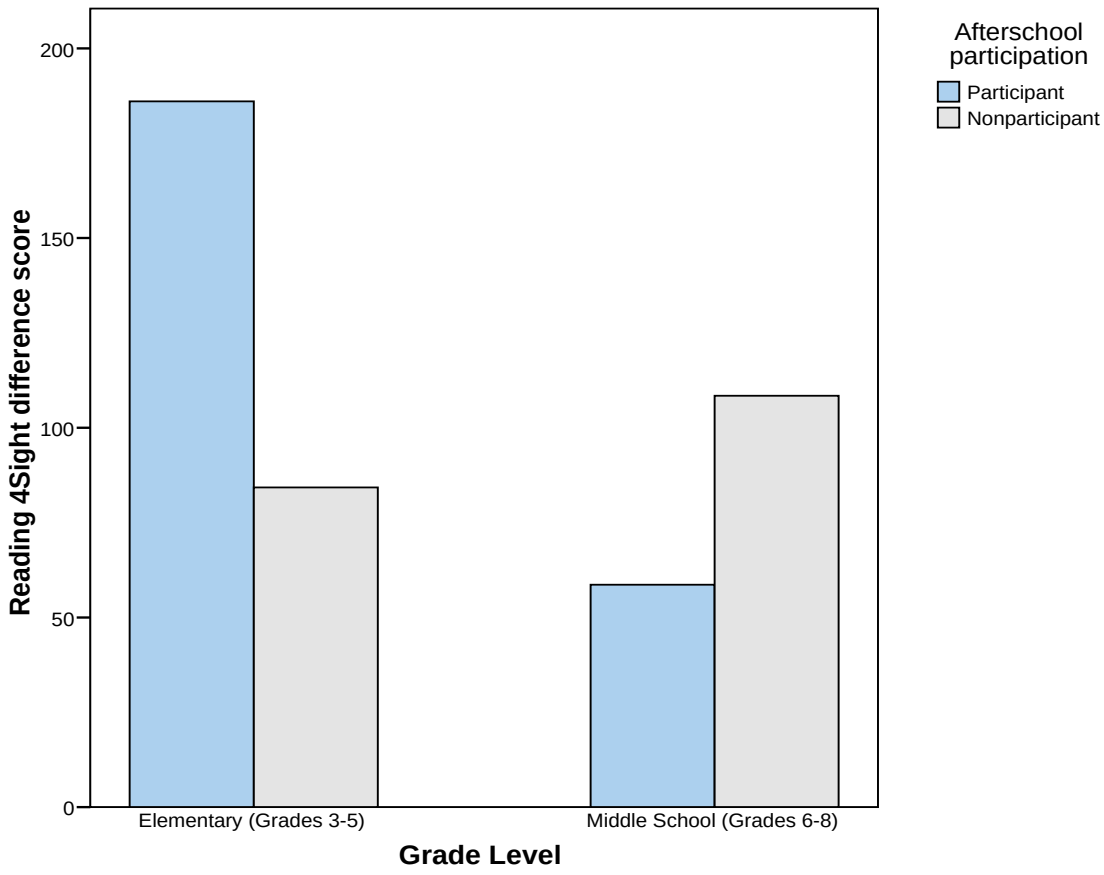

Figure 8. Means of reading difference scores comparing afterschool participation and grade level

4.2.2.3 Program Site

Program site was analyzed using a two-way ANOVA with two between subjects factors (afterschool participation and program site, i.e., School H or School M) with reading difference scores as the dependent variable. Results yielded a significant interaction between afterschool program participation and program site, $F(1, 93) = 6.15$, $p = .015$ (Table 23). As seen in Figure 9, afterschool participants at School M showed greater gains (184.55) than nonparticipants at School M (79.69) whereas afterschool participants at School H showed smaller gains (95.60) than nonparticipants at School H (117.05).

Table 23.
Two-Way ANOVA on Program Site and Afterschool Participation for Reading Difference Scores

Variable	Group	Mean	*SD*	*N*
School H	Participants	95.60	106.88	25
	Nonparticipants	117.05	144.85	21
School M	Participants	184.55	138.11	22
	Nonparticipants	79.69	111.22	29
Total difference score	Participants	137.23	129.15	47
	Nonparticipants	95.38	126.41	50

Source	*SS*	*df*	*MS*	*F*	*p*
Program site (P)	15882.83	1	15882.83	1.03	.314
Afterschool participant (A)	41519.91	1	41519.91	2.68	.105
P X A	95207.10	1	95207.10	6.15*	.015
Residual	1440656.61	93	15490.93		

* $p < .05$.

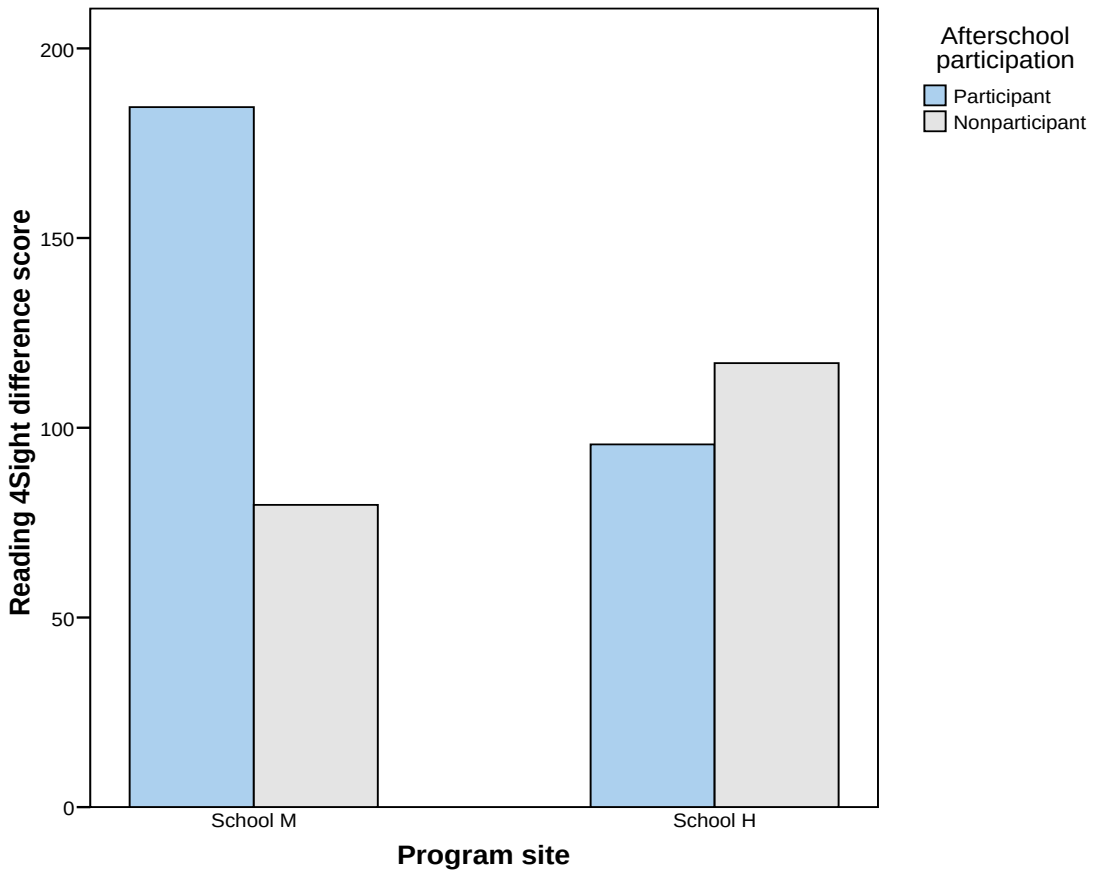

Figure 9. Means of reading difference scores comparing afterschool participation and program site

To summarize, male afterschool participants had larger gain scores in reading than nonparticipants, whereas female afterschool participants had smaller gain scores than female nonparticipants. Afterschool participants in grades 3 through 5 showed greater gain scores than their nonparticipant peers, whereas afterschool participants in grades 6 through 8 showed smaller gain scores than their nonparticipant peers. Afterschool participants at School M showed greater gains than nonparticipants at School M, whereas afterschool participants at School H showed smaller gains than nonparticipants at School H.

4.3 RESEARCH QUESTION 3

Is the afterschool program attendance rate at a school-based afterschool program related to academic outcomes?

To determine whether higher levels of afterschool attendance were related to larger academic gain scores, the correlation between these two variables was computed for mathematics and reading. The Pearson correlation between the number of days of attendance for the mathematics instruction and the mathematics gain scores was not significant (r = -.026, N = 78, p = .822). Students who attended between one and 18 days of mathematics instruction were included in this analysis. Correlations between the number of days of mathematics attendance and the mathematics gain scores for subgroups of students were not significant when considering gender or grade level (Table 24). The correlation for program site was not significant for students who attended the afterschool program at School H, but it was significant for students who attended the afterschool program at School M (r = .365, N = 33, p = .037)

The Pearson correlation between the number of days of attendance for the reading instruction and the reading gain scores was not significant (r = .021, N = 79, p = .855). Students who attended between one and 36 days of reading instruction were included in this analysis. Correlations between the number of days of reading attendance and the reading gain scores for subgroups of students were not significant when considering gender, grade level, or program site (Table 25).

Table 24.
Correlations Between Days of Subject Specific Attendance and Mathematics Gain Scores by Subgroups

Subgroups	*N*	*r*	*p*
Girls	35	-.085	.629
Boys	43	.027	.865
Elementary students	55	.031	.822
Middle school students	23	-.097	.660
School H	45	-.263	.080
School M	33	.365	.037*

* $p < .05$.

Table 25.
Correlations Between Days of Subject Specific Attendance and Reading Gain Scores by Subgroups

Subgroups	*N*	*r*	*p*
Girls	35	-.131	.453
Boys	44	.170	.269
Elementary students	55	.162	.237
Middle school students	24	-.262	.216
School H	47	-.115	.442
School M	32	.134	.466

5.0 DISCUSSION

5.1 SUMMARY OF STUDY

This study provides more understanding about whether regular attendance at a school-based afterschool program is related to greater academic gains and whether group differences of gender, grade level, and program site are related to different academic outcomes. It also gives more insight into measuring attendance at afterschool programs and the relationship between afterschool attendance and academic outcomes. The study was completed in the ecological context of afterschool programs which were run within charter schools that served primarily low income and minority students. The afterschool programs worked in collaboration with the charter schools and a number of important connections existed between the two entities, including staff who worked in both the school and the afterschool program, shared data between the school and the afterschool program, and regular communication about students between afterschool staff and school staff. Afterschool programs have grown considerably in recent years and this study contributes to the field by increasing our understanding of variables to consider when evaluating outcomes from afterschool programs.

This study used a quasi-experimental design with a pretest and a posttest, and it examined difference scores to compare groups. Scores for 47 afterschool participants with regular attendance (50% or greater subject specific attendance) were used for the reading analysis, scores

for 40 afterschool participants with regular attendance were used for the mathematics analysis, and scores for 50 nonparticipants were used for the comparison group. To examine the correlation between subject specific afterschool attendance and academic gains scores, 78 participants who attended between one day and 18 days of the mathematics instruction were used and 79 participants who attended between one day and 36 days of the reading instruction were used.

The theoretical basis for this study was Bronfenbrenner's work which proposes that understanding people involves understanding the different contexts that make up their lives and the connections between these contexts. Also, this study is based on the idea that one of the primary developmental tasks of middle childhood is academic success. If afterschool programs can assist students to reach success in this domain, it would be meaningful to know under which conditions and for whom afterschool programs are most effective.

It was hypothesized that differences would be found between afterschool participants and nonparticipants for a number of reasons. First, whereas many studies have considered programs that did not have formal connections with the school, a school-based afterschool program where there was regular communication about student progress between the school and the afterschool program was examined in this study. It was expected that afterschool participants would show greater gains than nonparticipants because of this communication and of the focused, specific nature of the additional instruction that they were receiving in the afterschool program. Second, attendance was measured precisely in this study, counting only the days that the student attended the mathematics or reading instruction and not using total program attendance as the measure. Third, the students' prior achievement was considered by using a pretest score, so that any

differences found could more likely be attributed to the intervention and not to preexisting differences between the groups.

After conducting statistical analysis of the mathematics scores, it was found that afterschool participants as a whole group showed greater gains than nonparticipants in mathematics. Examining the mathematics differences further, no statistically significant differences were found between boys and girls, although boys who participated in the afterschool program had larger gain scores than nonparticipants and girls who participated in the afterschool program had slightly smaller gains than nonparticipants. Elementary students who participated in the afterschool program showed greater gains in mathematics than elementary nonparticipants, but middle school students who participated showed smaller gains than nonparticipants. Students who attended the afterschool program at School M showed greater mathematics gains than nonparticipants at School M, whereas no differences were found between afterschool participants and nonparticipants at School H.

After conducting statistical analysis of the reading scores, it was found that afterschool participants as a whole group did not show greater gains in reading when compared to nonparticipants. Even though differences were not found in reading scores when examining afterschool participants as a whole group, differences were found among subgroups. Examining the reading differences further, it was found that boys in the afterschool program showed greater gains than boys who did not participate. Elementary students who participated in the afterschool program showed greater gains than elementary nonparticipants, but middle school participants showed smaller gains than middle school nonparticipants. Students who attended the afterschool program at School M showed greater gains in reading than nonparticipants at School M, and

students who attended the afterschool program at School H showed slightly smaller gains when compared to nonparticipants at School H.

No statistically significant correlation was found between the number of days of afterschool mathematics attendance and mathematics difference scores. A statistically significant correlation was found between days of afterschool mathematics attendance and mathematics difference scores when considering only students at School M, but no statistically significant correlations were found for subgroups based on gender or grade level. No correlation was found between the number of days of afterschool reading attendance and reading difference scores when all students with reading attendance were included or when students were examined by subgroups of gender, grade level, and program site.

5.2 UNDERSTANDING THE RESULTS

The results from this study support prior findings that understanding academic outcomes in relation to afterschool program participation is complex, and multiple variables need to be considered (Kane, 2004; Riggs & Greenberg, 2004a). Even though it was hypothesized that afterschool participants would show greater gains in mathematics and reading than nonparticipants, this was found primarily for specific subgroups of afterschool participants and not for all afterschool participants.

In this study, boys appeared to benefit more from the afterschool program's specialized instruction than girls. Riggs and Greenberg (2004a) propose that boys may show greater gains in afterschool programs due to qualities of the afterschool program climate, such as positive staff (Roffman, Pagano, & Hirsch, 2001), teaching negotiation to improves boys' social skills with

peers (Pierce, 1999), and offering options for boys so they learn to make decisions and take responsibility for their behavior (Vandell & Shumow, 1999). Because program climate and quality were not measured in this study, it is difficult to determine whether these variables contributed to the different outcomes seen between boys and girls.

Elementary students who attended the afterschool program showed mathematics and reading gains above their peers, whereas middle school students showed less growth than their peers who did not attend. This afterschool program was designed primarily for elementary-aged children who have different developmental needs than middle school-aged children. It is important for middle school students to have opportunities to gain independence and to further develop specific skills and talents, and the design and capacity of this program may not have allowed for that. Another explanation is that these differences may exist based on which middle school students participated in the afterschool program. Vandell and Posner (1999) note that older youth who are in programs are often there because they need more supervision and monitoring during the afterschool hours than their peers who are allowed to care for themselves at home. If students feel that they are being forced to be there, they may view the afterschool program as a punishment rather than a privilege, since they would rather be elsewhere with peers or at home. It may also be that the middle school students who attended the program already exhibited high levels of mathematics and reading achievement, so they had less room for growth than their peers who did not attend the programs.

A third area where group differences were seen in this study was in the afterschool program location. Afterschool participants at School M showed greater gains than nonparticipants at their school, whereas afterschool participants at School H showed little to no differences compared to the nonparticipants at their school. Prior studies of academic results for

afterschool programs have often showed positive results for students from low-income families, but both of these sites enrolled a majority of students from low-income families. One possible explanation is that students at School M received more individual attention in the afterschool program than students at School H. The afterschool program at School H was always at full capacity with a waiting list, whereas the afterschool program at School M was under enrolled. Similarly, School H may have had more discipline and classroom order issues related to serving a larger number of students, and these may have detracted from the specialized academic instruction. A second possibility is that the afterschool teachers at School M were somehow more effective than the teachers at School H. Since this study did not include data on the teachers or observations of them, this cannot be confirmed, but it would be important to pursue in further research on afterschool programs. A third possibility is that the activities and curricula at School M resulted in greater growth than what was used at School H. While both programs were run by the same nonprofit organization, there were differences in the academic content and activities at each site. A fourth possibility is that the differences may be an artifact of family differences of students (Vandell & Posner, 1999) or neighborhood differences. It may be that the parents of students at School M had higher levels of employment and/or education than the parents of students at School H, and this is related to the greater growth seen in these students. Since the schools are charter schools and not neighborhood schools, the students enrolled in them come from a variety of neighborhoods. It may be that students at School M live in safer neighborhoods with more resources than the students at School H or that their families are somehow intrinsically different from the families of the students at School H.

It is reasonable to wonder what are the salient qualities that may explain why this study found differences in academic outcomes whereas some prior studies have not found differences.

First, this study was designed using lessons learned from other afterschool researchers who have been building the foundation for this emerging field. As has already been described, this study used a measure for afterschool attendance that was more precise, which is critical for determining whether participation in afterschool programs is related to academic outcomes. Only students with a subject specific attendance rate of 50% or greater were included in these analyses. One of the possible reasons that prior studies have not found significant results in a relationship between afterschool attendance and academic outcomes is that attendance has been loosely defined or all participants who attended the afterschool program have been included in the analysis, whether they had an attendance rate of 5% or 100%. Also, a comparison group of similar nonparticipants was used when analyzing outcomes for this study. Students' prior achievement was accounted for so that academic achievement was measured as growth and not only as a single outcome variable. Group variables were considered and differences were found between groups, so the results were not consistent for everyone who participated in the afterschool programs, which is an important consideration for future research. A second relevant quality to understanding this study's outcomes is that academic gains may have been seen in these afterschool participants because of the collaboration between the afterschool program and the school. Scott-Little et al. (2002) found that for most afterschool programs the relationship between schools and afterschool programs was challenging. In this study, the schools and afterschool programs shared information and assessment data about children, and the afterschool programs could align their instruction more closely with individual students' needs and with the regular school day curricula which may explain the greater growth for students who participated in the afterschool program. Third, while the results of this study found academic benefits for some groups of students who attended afterschool programs, there are a number of alternate

explanations to understanding different academic outcomes that could not be fully explored due to limitations of this study.

One of the most surprising results of this study was the lack of correlation between days attending the specialized instruction in the afterschool program and the reading or mathematics difference scores. Even when subgroups were considered, the only statistically significant correlation was for students who attended the afterschool program at School M. Prior studies that examined attendance found a relationship between afterschool attendance and academic outcomes with students who attended programs more frequently showing greater gains than peers who attended less frequently (Jenner & Jenner, 2007; Vandell et al., 2007). While the statistical analysis in this study did not show significant correlations except for one subgroup, it does not follow that attendance is an irrelevant issue in examining academic outcomes from afterschool programs. Another component of attendance that was not measured in this study but should be considered in future studies is student engagement in the afterschool program. While this study included a measure of students' attendance on specific instruction days, it did not measure the students' level of involvement in the reading and mathematics instruction.

5.3 LIMITATIONS, IMPLICATIONS, AND DIRECTIONS FOR FUTURE RESEARCH

One of the primary limitations of this study is that it is a secondary data analysis, so the researcher did not have input into what data were collected. Future studies should collect more information about the family and neighborhood characteristics for afterschool participants and nonparticipants, including parents' employment status, parents' education level, and

neighborhood safety information of where the students live. This information would be helpful to understand if there are inherent differences between which students enroll in afterschool programs and which ones do not and to understand the differences in student outcomes from afterschool programs. It may be that afterschool programs work best for students from working families, because the program allows more flexibility for the parents' work schedules than for students who have a parent at home during afterschool hours.

A second limitation of this study is that more information was not collected on student characteristics. Some things that could be explored in future research are student engagement in the afterschool program, student motivation, or student choice in attending the afterschool program. What a student gains from an afterschool program may be closely related to whether they view the program as a privilege or as a punishment. It would also be important to know more about students who have IEPs who attend afterschool programs. While this study included students who had IEPs, nothing more was known about the nature of the IEPs, so it was not possible to conduct further analysis to determine if afterschool programs function differently for students with different abilities.

A third limitation of this study is that more was not known about the climate of the afterschool programs, including information about the instructors, curricula, or quality of the programs. Future studies that are seeking to understand differences in academic outcomes should consider curricula and program activities to determine if certain curricula are more effective than others in afterschool programs. It may be that children show greater outcomes from afterschool curricula and activities that allow for more choice and active learning than what is common in many regular school day classrooms. To do this, students could be measured at multiple time points within one school year so that specific activities and instruction are being evaluated for

short-term and long-term academic benefits. It would also be valuable to have more knowledge about the instructors in the program, their education and experience levels, and direct observations of their interactions with students. Program quality could be measured using a number of tools including the High/Scope Youth Program Quality Assessment, the School-Age Environment Rating Scale, or the Foundations Quality Assurance System. Finally, afterschool research needs to begin to include more longitudinal studies to fully understand outcomes from participating in afterschool programs.

An implication of this study for afterschool program providers is that afterschool programs should be designed around the developmental needs of the youth being served in the program. Middle school programs should not just try to replicate the model that is used by elementary programs. Afterschool providers should recognize the important role of peers and social networks in middle school, the need for middle school students to have greater choice and independence, and the necessity to provide opportunities for middle school students to explore new interests and talents that do not just mimic those that are offered to elementary students.

A second implication of this study for afterschool program providers and funders is that when afterschool programs are being evaluated, outcomes need to be examined by subgroups of students and not only by considering participants and nonparticipants. More resources and training should be devoted to assisting programs in setting measurable outcomes, evaluating program practices and qualities, and designing authentic ways to assess what knowledge and skills students are learning through participation in afterschool programs. If funders desire to see more measured outcomes from practitioners, afterschool providers could benefit greatly from support to measure outcomes thoroughly, so that the results are not doubtful, whether gains were found or not found. Providers may see unfounded outcomes if they only consider the variable of

attendance and do not consider further group differences such as gender, grade level, and program site.

In summary, future studies of afterschool programs should include more ecological measures including family and neighborhood characteristics, individual student characteristics, and comprehensive information about program quality. Students who participate in afterschool programs will be better served when researchers and afterschool providers can more clearly understand the complexity of variables related to outcomes of afterschool participation.

APPENDIX A

TEN ELEMENTS OF PROGRAM QUALITY IN AFTERSCHOOL PROGRAMS

1. Environment/Climate: Safe, healthy, and nurturing environment for all participants.

2. Administration/Organization: Well-developed infrastructure and sound fiscal management to support and enhance worthwhile programming and activities for all participants.

3. Relationships: Develops, nurtures, and maintains positive relationships and interactions among staff, participants, parents and communities to support the program's goals.

4. Staffing/Professional Development: Recruits, hires and trains diverse staff members who value each participant, understand their developmental needs, and work closely with families, school partners and coworkers to achieve the program goals.

5. Programming/Activities: Provides a well-rounded variety of activities and opportunities that support the physical, social and cognitive growth and development of all participants.

6. Academic alignment/achievement: Staff works closely with school staff to ensure that afterschool academic components and activities are aligned with and enrich school standards and curriculum.

7. Youth Participation/Engagement: Provides opportunities for participants to participate in planning, to exercise choice, and to engage in a rich variety of offerings and opportunities.

8. Parent/Family/Community Partnerships: Establish a strong partnership with families and communities in order to achieve program goals.

9. Program Sustainability/Growth: A coherent vision/mission and a plan for increasing capacity that supplies continuing growth.

10. Measuring Outcomes/Evaluation: A system for measuring outcomes and using that information for ongoing program planning, improvement and evaluation.

Programs & Initiatives: Building a Quality After-school Program. (2004). Retrieved from http://www.nysan.org/content/document/detail/1996 on January 3, 2010.

APPENDIX B

4SIGHT PENNSYLVANIA REPORTING CATEGORIES FOR READING

Developed from the *Reading Grade 5 Assessment Anchors and Eligible Content* (2007) and the *Academic Standards for Reading* (1999)

1. Comprehension and Reading Skills (A): Questions in this category may ask students to

- Identify and interpret the meaning of vocabulary. (A.1.1, A.2.1)
- Identify and apply word recognition skills (A.1.2, A.2.2)
- Make inferences, draw conclusions, and make generalizations based on text. (A.1.3, A.2.3)
- Identify and explain main ideas and relevant details. (A.1.4, A.2.4)
- Summarize a text as a whole. (A.1.5, A.2.5)
- Identify and describe genre of text. (A.1.6, A.2.6)

2. Interpretation and Analysis of Fictional and Nonfictional Text (B): Questions in this category may ask students to

- Identify, interpret, compare, describe, and analyze components of fiction and literary nonfiction. (B.1.1)
- Make connections between texts. (B.1.2)
- Identify, interpret, and describe figurative language in fiction and nonfiction. (B.2.1)

- Identify, interpret, and describe the point of view of the narrator in fictional and nonfictional text. (B.2.2)
- Differentiate fact from opinion in nonfictional text. (B.3.1)
- Distinguish between essential and nonessential information within or between texts. (B.3.2)
- Identify, compare, explain, interpret, describe, and analyze how text organization clarifies meaning of nonfictional text. (B.3.3)

3. Learning to Read Independently (RI): Questions in this category may ask students to

- Establish the purpose for reading a type of text before reading (1.1.5.A)
- Use knowledge of phonics, syllabication, prefixes, suffixes, the dictionary or context clues to decode and understand new word during reading. (1.1.5.C)
- Acquire a reading vocabulary by correctly identifying and using words. (1.1.5.E)
- Identify, understand the meaning of, and use correctly key vocabulary from various subject areas. (1.1.5.F)
- Demonstrate after reading understanding and interpretation of both fictional and nonfictional text. (1.1.5.G)

4. Reading Critically in All Content Areas (RC): Questions in this category may ask students to

- Read and understand essential content of informational texts and documents in all academic areas.(1.2.5.A)

5. Reading, Analyzing and Interpreting Literature (RAI): Questions in this category may ask students to

- Compare the use of literary elements within and among texts including characters, setting, plot, theme, and point of view. (1.3.5.B)

- Describe how the author uses literary devices to convey meaning. (1.3.5.C)
- Identify and respond to the effects of sound and structure in poetry. (1.3.5.D)
- Read and respond to nonfiction and fiction including poetry and drama. (1.3.5.F)

Success For All Foundation. (2008). *4Sight reading and math benchmarks 2008-2009 technical report for Pennsylvania*. Baltimore, MD: Success For All Foundation.

APPENDIX C

4SIGHT PENNSYLVANIA REPORTING CATEGORIES FOR MATHEMATICS

Developed from the Pennsylvania Academic Standards for Mathematics (1999) and the Math Grade 5 Assessment Anchors and Eligible Content (2007-updated May 2006)

A. Numbers and Operations (PA Mathematics Standards 2.1 and 2.2):

Problems in this category may ask students to

- Demonstrate an understanding of numbers, ways of representing numbers, relationships among numbers and number systems. (Anchor M5.A.1)
- Understand the meanings of operations, use operations and understand how they relate to each other. (Anchor M5.A.2)
- Compute accurately and fluently and make reasonable estimates. (Anchor M5.A.3)

B. Measurement (PA Mathematics Standard 2.3):

Problems in this category may ask students to

- Demonstrate an understanding of measurable attributes of objects and figures, and the units, systems and processes of measurement. (Anchor M5.B.1)

- Apply appropriate techniques, tools and formulas to determine measurements. (Anchor M5.B.2)

C. Geometry (PA Mathematics Standards 2.9 and 2.10):

Problems in this category may ask students to

- Analyze characteristics and properties of two- and three-dimensional geometric shapes and demonstrate understanding of geometric relationships. (Anchor M5.C.1)
- Identify and/or apply concepts of transformations or symmetry. (Anchor M5.C.2)

D. Algebraic Concepts (PA Mathematics Standards 2.8):

Problems in this category may ask students to

- Demonstrate an understanding of patterns, relations and functions. (Anchor M5.D.1)
- Represent and/or analyze mathematical situations using numbers, symbols, words, tables and/or graphs. (Anchor M5.D2)

E. Data Analysis and Probability (PA Mathematics Standards 2.6 and 2.7):

Problems in this category may ask students to

- Formulate or answer questions that can be addressed with data and/or organize, display, interpret or analyze data. (Anchor M5.E.1)
- Select and/or use appropriate statistical methods to analyze data. (Anchor M5.E.2)
- Understand and/or apply basic concepts of probability or outcomes. (Anchor M5.E.3)

REFERENCES

Afterschool Alliance. (2009). *Afterschool & Economic Recovery and Reinvestment Act.* Retrieved March 20, 2009 from http://www.afterschoolalliance.org/policyEconrecovery.cfm

Beckett, M., Hawken, A., & Jacknowitz, A. (2001). *Accountability for after-school care: Devising standards and measuring adherence to them.* Santa Monica, CA: RAND.

Black, A., Doolittle, F., Zhu, P., Unterman, R., Grossman, J., & Institute of Education Sciences (ED), W. (2008, June 1). The Evaluation of Enhanced Academic Instruction in After-School Programs: Findings After the First Year of Implementation. NCEE 2008-4021. *National Center for Education Evaluation and Regional Assistance*, Retrieved February 8, 2009, from ERIC database.

Black, A., Somers, M., Doolittle, F., Unterman, R., Grossman, J., National Center for Education Evaluation and Regional Assistance, et al. (2009). The Evaluation of Enhanced Academic Instruction in After-School Programs: Final Report. NCEE 2009-4077. *National Center for Education Evaluation and Regional Assistance*, Retrieved October 2, 2009, from ERIC database.

Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design.* Cambridge: Harvard University Press.

Capizzano, J., Tout, K., & Adams, G. (2000). *Child care patterns of school-age children with employed mothers.* Washington, DC: Urban Institute.

Carnegie Council Report on Adolescent Development. (1992). *A Matter of Time: Risk and Opportunity in the Nonschool Hour.* New York: Carnegie Corporation. (ERIC Document Reproduction Service No. ED355007)

Castagna, D. (2008). A quantitative case study analysis of the 4Sight benchmark assessment. (Doctoral dissertation, University of Pittsburgh, 2008). Retrieved April 14, 2009 from Dissertations & Theses @ University of Pittsburgh.(Publication No. AAT 3349162).

Committee on Community-Level Programs for Youth. (2000). *After-school programs to promote child and adolescent development: Summary of a workshop.* Washington, DC: National Academy Press.

Csikszentmihalyi, M. (1993). Contexts of optimal growth in childhood. *Daedalus, 122(1),* 31-56.

C. S. Mott Foundation Committee on afterschool research and practice. (2005). *Moving towards success: Framework for afterschool programs.* Washington, DC: Collaborative Communications Group.

Data Recognition Corporation. (2009, February). *Technical Report for the Pennsylvania System of School Assessment 2008 Reading and Mathematics*. Retrieved January 15, 2010 from http://www.portal.state.pa.us/portal/server.pt/community/technical_analysis/7447

Dryfoos, J. G. (1999). The role of the school in children's out-of-school time. *The Future of Children, 9(2),* 117-134.

Duffett, A., Johnson, J., Farkas, S., Kung, S., & Ott, A. (2004). *All work and no play? Listening to what kids and parents really want from out-of-school time.* New York: Public Agenda. (ERIC Document Reproduction Service No. ED485306)

Durlak, J. A., & Weissberg, R. P. (2007). *The impact of afterschool programs that promote personal and social skills.* Chicago, IL: Collaborative for Academic, Social and Emotional Learning.

Dynarski, M., James-Burdumy, S., Moore, M., Rosenberg, L., Deke, J., & Mansfield, W. (2004). When schools stay open late: The national evaluation of the 21st Century Community Learning Centers Program: New Findings. U.S. Department of Education, National Center for Education Evaluation and Regional Assistance. Washington, DC: U.S. Government Printing Office.

Eccles, J. S. (1999). The development of children ages 6 to 14. *The Future of Children, 9(2),* 30-44.

Eccles, J. S., Wigfield, A., & Schiefele, U. (1998). Motivation to succeed. In W. Damon and N. Eisenberg, (Eds.), *Handbook of child psychology, 5th edition: Vol. 3, Social, emotional and personality development* (pp. 1017-1095). New York: Wiley.

Edelman, M. W. (1987). Families in peril: An agenda for social change. Cambridge, MA: Harvard University Press.

Erikson, E. H. (1950). *Childhood and Society.* New York: W. W. Norton & Company Inc.

Goldschmidt, P., & Huang., D. (2007). *The long-term effects of afterschool programming on educational adjustment and juvenile crime: A study of the LA's BEST afterschool program.* Los Angeles: University of California, National Center for Research on Evaluation, Standards, and Student Testing & Center for the Study of Evaluation.

Halpern, R. (2000). The promise of afterschool programs for low-income children. *Early Childhood Research Quarterly, 15(2),* 185-214.

Halpern, R. (2002). A different kind of child development institution: The history of after-school programs for low-income children. *Teacher's College Record, 104(2),* 178-211.

Harter, S. (1998). The development of self-representation. In W. Damon and N. Eisenberg, (Eds.), *Handbook of child psychology, 5th edition: Vol. 3, Social, emotional and personality development* (pp. 553-618). New York: Wiley.

Higgins, E. T., & Parsons, J. E. (1983). Social cognition and the social life of the child: Stages as subcultures. In E. T. Higgins, D. N. Ruble, & W. W. Hartup, (Eds.), *Social cognition and social development* (pp. 15-62). Cambridge, MA: Cambridge University Press.

Hock, M. F., Pulvers, K. A., Deshler, D. D., & Schumaker, J. B. (2001). The effects of an after-school tutoring program on the academic performance of at-risk students and students with LD. *Remedial and Special Education, 22,* 172-186.

Hollister, R. (2003, February). *The growth in afterschool programs and their impact* Retrieved March 23, 2009, from http://www.brookings.edu/views/papers/sawhill/20030225.pdf

Jenner, E., & Jenner, L. W. (2007). Results from a first-year evaluation of academic impacts of an afterschool program for at-risk students. *Journal of Education for Students Placed at Risk, 12(2),* 213-237.

Kane, T. J. (2004). *The impact of after-school programs: Interpreting the results of four recent evaluations* (Working paper). New York, NY: William T. Grant Foundation. Retrieved April 20, 2009, from http://www.wtgrantfoundation.org/usr_doc/After-School_paper.pdf

Lauer, P. A., Akiba, M., Wilkerson, S. B., Apthorp, H. A., Snow, D., & Martin-Glenn, M. (2006). Out-Of-School-Time programs: A meta-analysis of effects for at-risk students. *Review of Educational Research, 76(2),* 275-313.

Lawrence, S., Kreader, J. L., & National Center for Children in Poverty. (2006, October). *School-Age child care arrangements*. Retrieved March 28, 2009, from the Child Care and Early Education Research Connections Web site: http://www.childcareresearch.org

Mahoney, J. L., Larson, R. W., Eccles, J. S., & Lord, H. (2005). Organized activities as developmental contexts for children and adolescents. In J. L. Mahoney, R. W. Larson, & J. S. Eccles (Eds.) *Organized Activities as Contexts of Development: Extracurricular activities, After-School and Community Programs* (pp. 3-22). Mahwah, NJ: Lawrence Erlbaum Associates.

Mahoney, J. L., Lord, H., & Carryl, E. (2005). An ecological analysis of afterschool program participation and the development of academic performance and motivational attributes for disadvantaged children. *Child Development, 76(4),* 811-825.

Mahoney, J. L., & Zigler, E. F., (2006). Translating science to policy under the No Child Left Behind Act of 2001: Lessons from the national evaluation of the 21st-Century Community Learning Centers. *Journal of Applied Developmental Psychology, 27,* 282-294.

Marshall, N. L., Garcia-Coll, C., Marx, F., McCartney, K., Keefe, N., & Ruth, J. (1997). After-School time and children's behavioral adjustment. *Merrill-Palmer Quarterly, 43,* 497-514.

Masten, A. S., & Coatsworth, J. D., (1998). The development of competence in favorable and unfavorable environments. *American Psychologist, 53,* 205-220.

McCall, R. B., & Green, B. L. (2004) Beyond the methodological gold standards of behavioral research: Considerations for practice and policy. *Social Policy Report: Giving Child and Youth Development Knowledge Away, 18,* 3-19.

Meyers, K., Adams, S., Gottlieb, J., Hafetz, J., Kaynak, O., Norton, L., Robertson, A., Weinless, D., White, T., & Philadelphia Safe and Sound. (2007). One size doesn't fit all: Creating evidence-based outcome expectations for youth development programs. *Philadelphia Safe and Sound Research and Policy Brief.*

Miller, B. (2003, June 1). *Critical Hours: Afterschool Programs and Educational Success.* (ERIC Document Reproduction Service No. ED482794) Retrieved March 10, 2009, from ERIC database.

Pettit, G. S., Laird, B. D., Bates, J. E., & Dodge, K. A. (1997). Patterns of after-school care in middle childhood: Risk factors and developmental outcomes. *Merrill-Palmer Quarterly, 43(3),* 515-538.

Piaget, J., & Inhelder, B. (1973). *Memory and intelligence*. London: Routledge and Kegan Paul.

Pierce, K. M., Hamm, J. V., & Vandell, D. L. (1999). Experiences in after-school programs and children's adjustment in first-grade classrooms. *Child Development, 70,* 756-757.

Posner, J. K., & Vandell, D. L. (1994). Low-Income children's afterschool care: Are there beneficial effects of afterschool programs? *Child Development, 65*, 440-456.

Posner, J. K., & Vandell, D. L. (1999). Afterschool activities and the development of low-income urban children: A longitudinal study. *Developmental Psychology, 35(3),* 868-879.

Riggs, N. R., & Greenberg, M. T. (2004a). Afterschool youth development programs: A developmental-ecological model of current research. *Clinical Child and Family Psychology Review, 7(3),* 177-190.

Riggs, N. R., & Greenberg, M. T. (2004b). Moderators in the academic development of migrant Latino children attending after-school programs. *Journal of Applied Developmental Psychology, 25*(3), 349-367.

Roffman, J. G., Pagano, M. E., & Hirsch, B. J. (2001). Youth functioning and experiences in inner-city after-school programs among age, gender, and race groups. *Journal of Child and family Studies, 10*, 85-100.

Rogers, F. (2003). The world according to Mister Rogers: Important things to remember. New York: Hyperion.

Scott-Little, C., Hamann, M., & Jurs, S. G. (2002). Evaluations of after-school programs: A meta-evaluation of methodologies and narrative synthesis of findings. American Journal of Evaluation, 23(4), 387-419.

Seppanen, P. S., Love, J. M., deVries, D. K., Bernstein, L., Seligson, M., Marx, R., et al. (1993). *National Study of Before and After School Programs: Final report.* Washington, DC: U.S. Department of Education, Office of Policy and Planning. Portsmouth, NH: RMC Research Corporation.

Simkhovitch, M. (1904, September). The public school: Its neighborhood use, a recreational and social center. *The Commons*, 406-417.

Stoltz, T.. Predicting performance on the Pennsylvania System of School Assessment using the Developmental Reading Assessment and the 4Sight predictive benchmark assessment. Ed.D. dissertation, Duquesne University, United States -- Pennsylvania. Retrieved February 2, 2010, from Dissertations & Theses: Full Text.(Publication No. AAT 3338621). ProQuest Document ID# 1637588241

Success For All Foundation. (2008). *4Sight reading and math benchmarks 2008-2009 technical report for Pennsylvania*. Baltimore, MD: Success For All Foundation.

U.S. Department of Education (2003). *When schools stay open late: The national evaluation of the 21st-Century Community Learning Centers program, first year findings.* (Publication No. ED-99-CO-0134). Washington, DC: Author.

U.S. Department of Education (2009). *Guide to U.S. Department of Education Programs.* Washington, DC: Author.

Vandell, D. L., & Corasaniti, M. A. (1988). The relation between third graders' after-school care and social, academic, and emotional functioning. *Child Development, 59,* 868-875.

Vandell, D. L., & Posner, J. (1999). Conceptualization and measurement of children's after-school environments. In S. L. Friedman & T. D. Wachs (Eds.), *Assessment of the Environment Across the Lifespan* (pp. 167-197). Washington, DC: American Psychological Association.

Vandell, D. L., Reisner, E. R., & Pierce, K. M. (2007, October 1). *Outcomes linked to high quality afterschool programs: Longitudinal findings from the study of promising afterschool programs.* Policy Study Associates, Inc., (ERIC Document Reproduction Service No. ED499113) Retrieved March 15, 2009, from ERIC database.

Vandell, D. L., & Shumow, L. (1999). Afterschool child care programs. *The Future of Children 9(2),* 64-80.

Weiss, H. B., Little, P. M., Bouffard, S. M., Deschenes, S. N., & Malone, H. J. (2009). *The federal role in out-of-school learning: Afterschool, summer learning, and family involvement as critical learning supports.* Retrieved March 20, 2009, from the Harvard Family Research Project Web site: http://www.hfrp.org/complementary-learning/publications-resources/the-federal-role-in-out-of-school-learning-afterschool-summer-learning-and-family-involvement-as-critical-learning-supports

Welsh, M. E., Russell, C. A., Williams, I., Resiner, E. R., & White, R. N. (2002). *Promoting learning and school attendance through after-school programs: Student-Level changes in educational performance across TASC's first three years.* Washington, DC: Policy Study Associates.

Zief, S. G., Lauver, S., & Maynard, R. A. (2006). *Impacts of afterschool programs on student outcomes*. Retrieved February 8, 2009, from the Campbell Collaboration Web site: http://db.c2admin.org/doc-pdf/zief_afterschool_review.pdf